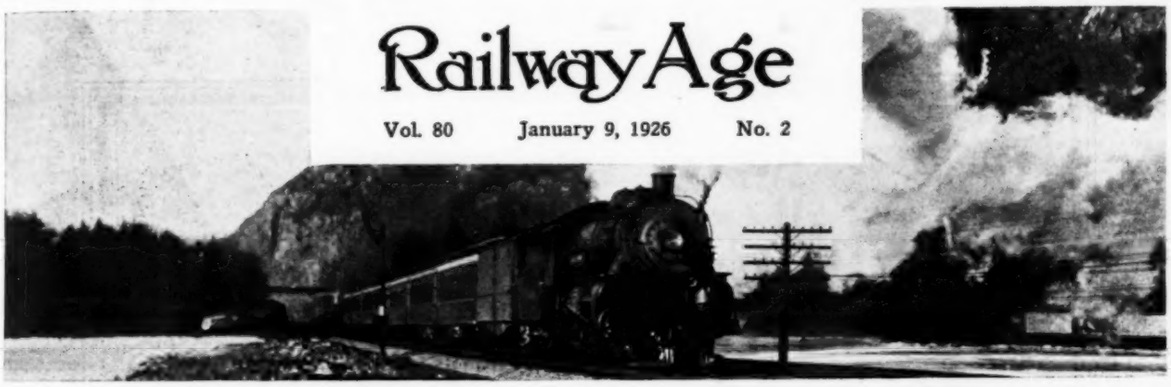
Railway Age

Vol. 80 January 9, 1926 No. 2



On the New York Central in the Hudson Valley—Photo, Ewing Galloway.

Contents

Published every Saturday and daily eight times in June by the

Simmons-Boardman Publishing Company, 30 Church Street, New York

EDWARD A. SIMMONS, *President*
L. B. SHERMAN, *Vice-Pres.*
HENRY LEE, *Vice-Pres. & Treas.*
SAMUEL O. DUNN, *Vice-Pres.*
F. H. THOMPSON, *Vice-Pres.*
C. R. MILLS, *Vice-Pres.*
ROY V. WRIGHT, *Sec'y*

CHICAGO: 608 South Dearborn St.
CLEVELAND: 6007 Euclid Ave.
LONDON, England: 34 Victoria St., Westminster, S. W. 1.
WASHINGTON: 17th and H Sts., N. W.
SAN FRANCISCO: 74 New Montgomery St.
NEW ORLEANS, MANDEVILLE, LA.
Cable Address: Urasigmeo, London

The Railway Age is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.)

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

Subscriptions including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free; United States, Mexico and Canada, $6.00. Foreign countries, not including daily editions, $8.00. When paid through the London office £1.15.0. Single copies, 25 cents each, or 1s.

Railway Age

Vol. 80, No. 2 *January 9, 1926*

Table of Contents Appears on Page 5 of Advertising Section

Spending Money for Refinements in Practice

THERE are among railway managements those which pride themselves on the fact that their expenditures for supervision are small as compared with those made by other roads of the same general character. Other roads, however, point to operating results which have been ascribed largely to refinements in practice brought about through the exercise of more minute supervision, exercised largely by system staff officers and their assistants. A remarkable illustration of this policy is presented elsewhere in this issue in an article by E. F. Robinson, chief engineer of the Buffalo, Rochester & Pittsburgh, which outlines the minute supervision exercised in the treatment and application of railway crossties for the purpose of insuring a high degree of refinement in all practices relating thereto. The fact that these measures have been responsible for an increase in the life of ties to an estimated average of 25 years is surely a demonstration that such refinements have paid in this case. Thus, assuming that this railroad could have obtained an average life of 20 years for its crossties under less rigid rules of practice, and assuming that the ties cost $2 in place and that there are 3,200 ties per mile of track, the increase of five years in the life of ties represents an annual saving of $64 per mile per year, an amount which would pay for a considerable increase in supervision and special measures for the conservation of the ties. It is well to keep in mind, however, that the economies to be obtained by an increase in the life of ties decrease as the average life of the ties increases. For example, an increase in the life of the ties from 15 to 16 years would represent a saving of $32 per mile, while an increase in the life from 24 years to 25 years would save only about $11 per mile. However, it will be some time before the railroads as a whole will have effected such a degree of refinement in their practices for the conservation of ties as to find occasion for any alarm on this score.

An Outstanding Tunnel Project

THE announcement by the Great Northern that it will undertake the construction of a tunnel 7¾ miles long through the Cascade mountains marks another epoch in tunnel construction. It is less than fifteen years since the Canadian Pacific undertook the construction of a tunnel five miles long through the Selkirk mountains and this was very properly heralded as an undertaking without precedent on this continent. The successful completion of this project gave confidence to the promoters of the long discussed Moffat tunnel on the line of the Denver & Salt Lake in Colorado and work was started on this six-mile project about three years ago, since which time it has been prosecuted actively. The Great Northern tunnel which is now being undertaken will be 50 per cent longer than that of the Canadian Pacific and 1½ miles longer than the one in Colorado. It will, therefore, establish a new record. The successful prosecution of a project of this character requires engineering ability and courage of a high order, for the uncertainties are many. The Canadian Pacific tunnel was noteworthy by reason of the construction of a small pioneer tunnel outside of and at one side of the main bore, from which cross cuts were driven into the line of the tunnel proper and the work prosecuted from a number of faces, thereby greatly expediting the completion of the project. The tunnel in Colorado is being driven by the same method, the pioneer tunnel in this instance being available for use as a water tunnel at a future date if this should become desirable. The present plans of the Great Northern contemplate a combination of this pioneer method at the west end with a shaft portal heading at the east end. A rule of thumb estimate has long placed the cost of such construction at a million dollars a mile, rising as the length increases owing to the greater difficulty of disposing of the materials. However, the topographic conditions which make such construction necessary also impose severe handicaps on railway operation and the elimination or reduction of these handicaps makes possible correspondingly large economies. Thus, although the Great Northern tunnel is estimated to cost $10,000,000, the estimated reductions in costs of operation and maintenance are so great, as indicated by an article published elsewhere, as to promise yield of a good return on the investment

Fuel Records and Engine Crews

AMONG the operating efficiency factors mentioned in these columns last week, the most favorable showings were made in gross ton-miles per train hour and gross tons per train, fuel consumption per thousand gross ton-miles, however, being a close third, with a decrease of 14.3 per cent in the first nine months of 1925 as compared to a similar period in 1923. This splendid record in fuel economy is indisputable evidence that many thousands of men in different branches of railroad service have co-operated as never before to save fuel. The engine crews have played their part and demonstrated not only that they know how to reduce the fuel consumption of locomotives but that they have a distinct desire to accomplish this end. A master mechanic recently reported, "It might interest you to know that frequently I have an engineer call on me, advising that he has hauled 1,600 tons from a given point to V—with six tons of coal, and asking if I will not figure out the pounds of coal per thousand gross ton-miles, as he thinks that he has established a record." Such an attitude as this is impossible unless engine crews feel that they are being treated fairly and are proud of the road they work for. The engine crews occupy a strategic position in the control of locomotive fuel consumption and the record established during the past year proves that on the whole there has been close co-operation from both sides of the cab; both enginemen

and firemen have studied the action of the locomotive on the fire under various operating conditions and have been keenly alert to discover and correct the many minor defects which directly or indirectly influence fuel consumption and which are bound to develop without the exercise of constant vigilance. That there is still room for improvement is shown by the following comment by another master mechanic, "There are too many men operating locomotives upon the theory of 'a big locomotive, a big noise.' The engineman that creates the greatest noise at the stack is usually anything but successful, and his failure is bound to be detrimental to the general condition and the efficiency of the locomotive." If fuel consumption and other operating efficiency records are to continue to improve during 1926, educational and morale building efforts among the engine crews must be redoubled and an adequate force of road foremen maintained to carry on this important work.

The Cummins Consolidation Bill

SENATOR CUMMINS has worked hard and earnestly for several years trying to find a formula for the solution of the "railroad problem." In the minds of many the problem lies mainly in the fact that our policy of regulation of the railroads for the people and by the people, without too much assistance in the process from those who have ever made railroading a business or who have studied Wall Street finance at close range, is inclined to keep railway rates down to a point where only the most efficient and most favorably located railroads can consistently prosper under them. Senator Cummins would not define the problem in just that way, but at any rate he is seeking to remedy the situation thus described, in somewhat the same "logical way" that the deacon built the "one-hoss shay," avoiding causes of possible breakdown by making each part of the railway system "as strong as the rest."

One result of the Senator's efforts, although complicated by the results of the efforts of a good many others, was the Transportation Act of 1920, often described as the most constructive piece of railway legislation ever enacted, but almost the only example of railroad legislation that was ever intended to be especially constructive. In that act an endeavor was made not only to strengthen the transportation system but to make each part as strong as the rest by grouping the roads into a limited number of systems of approximately equal strength and by using temporarily half of the excess earned by the stronger roads above 6 per cent on their value to aid the weaker roads until all have been placed on the 6 per cent level "as nearly as may be." Some have feared that the result of such a process might be only to make each system no stronger than the rest, but probably the degree of strength that would ultimately be allowed the uniform systems would depend more upon the character of the administration of the act when that time is reached than upon the present language of the law. While the Transportation Act has undoubtedly had many beneficial results it has by no means accomplished all that was hoped for, for many reasons, and now Senator Cummins has introduced a new bill in an effort to improve upon it by amending the consolidation and recapture provisions. Hearings on the bill are now scheduled to be held before the Senate committee on interstate commerce beginning on January 11.

In many respects the provisions of the latest Cummins bill would correct important defects in the act which have come to be generally recognized after nearly six years of experience with it. Let us assume that a few strong competing railway systems, each consistently earning 6 per cent on a fair value, could serve the commerce of the country better than it has been served in the past. If such an ideal arrangement may be assumed as a major premise the conclusion is not beyond reasonable expectation that such a result probably could be accomplished much more readily under the plan he proposes for a period of voluntary consolidations than under the many restrictions which a pre-conceived artificial plan would add to the difficulties which would exist in any event. Senator Cummins' plan also offers some assistance to railroads desirous of effecting voluntary consolidations by removing some of the obstacles of existing law as well as the "nuisance value" of the ever-present dissenting minority.

Unless the roads in three years have made what seems to the Interstate Commerce Commission to be satisfactory progress toward consolidation it would be required to prepare a plan for the completion of the process, but the roads would have been given an opportunity to initiate it along natural lines and probably with a considerable degree of harmony with existing relations. After the commission has prepared its plan, however, pressure upon the carriers to follow it would be provided, under the terms of the bill, by the recapture of all earnings above 6 per cent, instead of only half of them as under the present law, and the distribution of the excess among roads earning less than 5 per cent. A system certified by the commission to be complete would be exempted from recapture but as long as 5¾ per cent after taxes is considered a fair return to be aimed at in fixing rates it would not be expected that a system would often have anything to recapture.

If the time already taken by the Interstate Commerce Commission to prepare to pass upon the Van Sweringen Nickel Plate unification plan, on top of the time required to bring the plan to the stage of applying for authority, is any criterion, three years is a rather short time in which to expect a great deal of progress to be made toward a plan of consolidation on anything like the scale of the present tentative plan of the commission. Even if the commission could be expected to handle such a case in half or a quarter of the time in the future, three years would hardly be enough to more than show the good intentions of the railroads.

One of the reasons why the results of the Transportation Act have fallen so far short of some of the expectations is that it failed to take into consideration sufficiently certain practical aspects, such as the time required to accomplish what it proposed. For example, its fundamental policy contemplated a standardization of railroads through a plan of consolidations which is not ready after six years and a plan of recapture as well as a rate level based on a valuation which is not yet even in sight. A tentative consolidated valuation of the railroads by three groups served imperfectly as a rough yard-stick by which to measure the general advance in rates which was recognized as imperatively necessary in 1920, but attempts to apply a tentative basis of valuation to individual roads for recapture or division purposes show that a more accurate measure is necessary.

In the original Cummins bill which was passed by the Senate and went into the conference which produced the Transportation Act, a seven-year period was allowed for voluntary consolidations before the commission would be required to prepare a plan. This would seem to be much better proportioned to the size of the problem than the three-year period now proposed. In the light of experience it is apparent that more progress might have been made in the last six years if the seven-year plan had been adopted in 1920.

The Effect of Reductions in Freight Rates

THERE is less misrepresentation of railway matters now than there has been for many years, but one charge that is made occasionally is that the railways constantly are asking and getting advances in rates. No doubt this is to some extent based on the fact that the western lines actually are seeking a small general advance in freight rates. The truth is, that owing to constant readjustments here and there, some made voluntarily by the carriers, some under orders of the Interstate Commerce Commission, the general level of rates is slowly but steadily declining, as it did before the war.

Complete railway statistics for 1925 have not been issued, but enough are available to show that the average rates per ton per mile and per passenger per mile last year were the lowest since 1920, and that in the country as a whole reduction in the average freight rate per ton per mile in 1925 cost the railways more freight revenue than the total advance being asked in western territory would give them.

The average revenue per ton per mile in 1921 was 1.274 cents; in 1922, 1.176; in 1923 and 1924, 1.116; and in 1925, approximately 1.094 cents. The average freight rate in each of the three large territories was less than in the year before. The reduction in the country as a whole as compared with 1924 may seem small, but it saved the shipping public over 90 million dollars, while the advance being asked for by the western lines would amount to only about 85 million dollars annually. The difference between the average freight rates of 1922 and 1925, saved the shipping public about 339 million dollars, computing on the basis of the business actually handled last year, while the difference between the average rates of 1921 and 1925, computing in the same way, resulted in a saving in total freight charges of about 743 million dollars.

There has been no general reduction in passenger rates, as there was in freight rates in 1922, but the average passenger rate, also, has been steadily declining owing to the making of special excursion rates, etc. The average per mile in 1921 was 3.088 cents; in 1922, 3.028; in 1923, 3.019; in 1924, 2.978 and in 1925 about 2.920 cents. On the basis of the passenger business handled last year the difference between the average rates of 1921 and 1925 represented a saving to the traveling public of about $60,300,000, while the difference between the average rates of 1924 and 1925 represented a saving to the public of about 21 million dollars.

The reductions of both freight and passenger rates in 1925 as compared with 1924 amounted to about 112 million dollars. The taxes paid by the railways increased about 16 million dollars. Thus, through reduced rates and increased taxes, the public gained about 128 million dollars.

In spite of a reduction of passenger business, of an increase in taxes and of an increase in the average wage paid railway employees, the railways succeeded in getting an increase over 1924 in their net operating income of about 143 million dollars. Thus, the increase in economy and efficiency of operation benefited every class concerned —the public, by helping make possible reductions of rates and payment of increased taxes; the employees, by helping make it possible to pay an advance in their average annual wage from $1,613 to $1,638; and the railways, by making possible, in spite of these adverse influences, an increase from 4.33 to about 4.80 in the percentage of return earned by them on property investment.

Regulation of Railway Profits in Relation to Efficiency

VARIOUS proposals that are being made for changes in the federal government's present method of dealing with railway net operating income may well cause deep concern to those who believe that economic progress is mainly determined by the opportunities and incentives given business men, and that it may be seriously hindered or arrested by impairing these opportunities and incentives and by undue extension of bureaucratic governmental interference. The Potter plan and others of similar tendency are less objectionable and dangerous because of any injustice they would do as between individual railways as because they would tend to reduce the incentives to efficient and economical operation and to increase government interference with railway management.

The two greatest incentives to every form of human endeavor are the fear of punishment and the hope of reward. They are the driving forces which make the system of capitalism superior to that of socialism. To whatever extent they are weakened the advantages of capitalism as compared with socialism are reduced.

Government regulation of railways in this country originally was adopted to prevent the fixing of rates that were unfairly discriminatory of excessive as measured by common law standards. The Supreme Court of the United States nullified certain schedules of rates fixed by government authorities, not upon the common law ground that they were unfairly discriminatory or excessive, but upon the constitutional ground that they would so reduce the net return earned as to confiscate property. The obvious purpose of the court was to fix a limit below which the net returns of concerns whose rates were subject to regulation might not be reduced. Regulating authorities then began to try to fix rates so that the returns earned would not exceed the minimum set by the court. Thus, what began as regulation of rates developed into regulation and limitation of profits.

Whether this regulation of profits was economically sound or not, it finally had to be accepted as a fact. The Interstate Commerce Commission for years showed such fear of making rates high enough to enable a few roads to earn more than a "fair return"—in other words, an amount rising above the line of confiscation—that it constantly fixed rates so low that on the average the railways as a whole earned less than a fair return. The proposal to "recapture" part of the "excess" earnings of the stronger companies presented a choice between two evils. Should rates continue to be so regulated that most railways would earn less than a fair return? Or, should the provision for the recapture of part of the earnings of the stronger roads be adopted as a means of causing rates to be made high enough to enable the railways as a whole to earn on the average a "fair return"? The latter alternative was accepted and advocated by many, including the *Railway Age*, as the lesser evil of the two. It has not thus far proved so. Rates have thus far been so regulated under the Transportation Act that the railways on the average have earned less than a fair return, and in addition so-called "excess" earnings of the more prosperous roads, when they have been made, have been subject to recapture.

The fact must be recognized, however, that the rate-making provisions, including the recapture clause, were adopted mainly in the interest of the weak roads. If, as a result of them, the net returns earned by the roads as a whole were increased, the weak roads would be allowed to retain the entire increase in their net operating income, while the stronger roads would have part of the increase

in theirs taken from them. Furthermore, it cannot be said with certainty that the rate-making provisions have proved valueless. They have required the Interstate Commerce Commission to say what it regards as a fair return, and have thereby made it possible constantly to call attention to the fact that the commission, whether owing to abnormal conditions or to other causes, has not during the last five years so fixed the rates as to conform to its own standard of fairness and public expediency. They now afford a powerful argument for advancing rates in the west and for not prematurely reducing them elsewhere.

Just, however, as the time is arriving when the railways might reasonably be expected to begin to derive, not theoretical and intangible, but real and tangible, benefits from the rate-making provisions various proposals for changing them, or at least not carrying them out, are being advanced. Most of these contemplate taking net operating income from the strong roads and giving it to the weak roads, regardless of the fact that the present rate-making provisions, if carried out in their spirit and letter, would benefit the weak roads much more than the strong roads. Mark W. Potter advocates dividing the proposed advance of 5 per cent in freight rates between the western lines in proportion to the extent to which they fail to earn 5¾ per cent upon their property investment. Senator Cummins has introduced a consolidation bill under which, after a short period, all the return earned by the strong roads in excess of 6 per cent would be taken and divided among other roads in proportion to the extent to which they failed to earn 5 per cent.

Such proposals as these are extremely far reaching. Before one supports them he should consider not only the technical difficulties in the way of carrying them out, but the effect their adoption would have on railway regulation and management. The *Railway Age* already has mentioned some of these technical difficulties, and again refers to certain of them in an editorial in this issue regarding the accounting problems presented by the Potter plan. Suppose, however, these technical problems to be solved as doubtless with great difficulty they can be, and suppose it to be settled that each railway that earns more than 6 per cent net operating income upon its property investment or valuation is to have part or all of its income in excess of this amount distributed among roads that earn less than this. It is the well known policy of all railways to increase their maintenance expenditures when total earnings increase and to reduce them when total earnings decline. The amount that should be spent annually for maintenance is a fluctuating and not a fixed sum. Railway officers are human beings, and not automatons, as regulation often seems to assume. They are influenced like other men by the fear of loss and the hope of gain. The existing recapture provisions undoubtedly give an incentive to officers of roads that may earn or actually are earning more than 6 per cent to increase maintenance expenditures. Therefore the existing recapture provision tacitly imposes upon the Interstate Commerce Commission a special duty and responsibility to scrutinize the accounts and police the maintenance expenditures of the more prosperous railways. Obviously the necessity for doing this would be increased if all, instead of only one-half, of the net operating income in excess of 6 per cent were recaptured. However, even if a group of railways does earn an average of 5¾ per cent the number of roads in the group that will earn over 6 per cent, and whose accounts and expenditures will have to be especially policed because of the recapture provision, will be comparatively small. On the other hand, if there should be adopted a plan for distributing the recaptured earnings among railways that earned less than 5¾ per cent or 5 per cent, this immediately would afford some incentive to these roads also to increase their maintenance expenditures, and therefore would make it necessary for the commission to supervise their accounting and police their maintenance expenditures to the same extent as those of the strongest roads.

The inevitable result would be to increase the bureaucratic influence and control of the commission in the management of all railways, and correspondingly to reduce the incentives to efficiency and economy, and the freedom of initiative and action, of their managers.

The managers of some weak roads may on first thought be disposed to favor some such plan. But can they regard with complacency the prospect of the inevitable increase in the participation of the government in the management of their properties? Can they disregard the fact that, as shown by experience, a road that is weak today may be a strong road within a few years, and will then have to give up earnings it has made instead of receive earnings that it has not made?

It does not impugn the ability or integrity of railway officers to say that any change in regulation that affects the incentives to efficiency and economy will affect the efficiency and economy of management. No man, whatever his integrity and ability, is immune from the incentives of fear and hope. The consideration involved may be money for oneself, or fear or hope regarding promotion or reputation, but whatever it is it cannot be ignored. The progress in efficiency and economy of our railways has been due to incentives that have driven their officers to do their best, and to opportunities to do it. Any kind of regulation that weakens these incentives, in proportion to the extent that it does weaken them, will sap the efficiency and economy with which the railways are developed and managed.

More About Potter Plan Accounting Problems

IT has been alleged with reference to the Potter plan that the accounting difficulties of putting the plan into effect are insuperable. Is this correct? To answer the question requires a definition of the term accounting, and likewise an insight into the views that the Interstate Commerce Commission might happen to hold at the time it was called upon to administer the plan. The Potter plan, the reader will be reminded, calls for a 5 per cent increase in the rates of the western railroads, the pooling of the proceeds of this increase and distribution of the proceeds on the basis of the proportion of each carrier's deficiency, if any, under an amount of net railway operating income equivalent to 5¾ per cent on the carrier's property investment.

The first problem of accounting will be to figure the amount of the proceeds of the 5 per cent rate increase. This part of the work would be comparatively simple and would require the time of but a few clerks. However, the railroads will also be required to figure the deficiency of their net railway operating income under 5¾ per cent on their property investment. The commission apparently would have the power to set up for the purpose of administering the plan a certain property investment for each road. It could, indeed, decide that the total shown in the book accounts would be sufficiently satisfactory to use for the purpose in hand. It could take the net railway operating income reported in the usual manner in the carrier's monthly reports and then readily figure the deficiency under 5¾ per cent. With this form of pro-

cedure the accounting would represent no problem and the advocates of the plan would be justified in saying, as they have that the importance of the accounting objection has been greatly exaggerated.

But, would the commission be likely to be satisfied with such a simple method of procedure? The supposition is that it would not. It has not been satisfied with simple methods as relates to recapture, and it was not satisfied with simple methods or short cuts when it had to determine the money owing the carrier by the government as standard return during the period of federal control or the guaranty for the six months following. If we look at this thing as if it were a mere problem of bookkeeping, the Potter plan advocates are right—there is no accounting problem. If it means that accounting principles are to be determined, that is something else. And must not the greatest care be taken as relates to these accounting principles? Even if the Potter plan is legal and has justification in the terms of the Transportation Act, as the Potter plan advocates contend, it is still also true that taking money from one carrier and giving it to others is something that must not be done without the most substantial adherence to definite principle and procedure. Rule of thumb methods are all right in their place but in matters as important as this—which may become most important precedent—they are not likely to be equitable or safe. We must, therefore, have accurate determination of property investment, of net railway operating income as well as of the amount of the proceeds of the 5 per cent rate increase. Do we still not also require more adequate definition of what is honest and efficient management, and of what constitutes reasonable expenses for maintenance?

It may be going a long way to remark that the accounting problems of the Potter plan are insuperable. The railroad accounting profession can probably solve the problems if given sufficient time. It should be plain enough, however, that the accounting problems are likely to be so complicated as to make the plan not worth the trouble required to put it into effect in the present stage of uncertainties about valuation figures, and particularly before we have more definite indexes of operating efficiency and reasonable charges for maintenance.

New Books

Freight Traffic Red Book for 1926. *By H. G. Williams and C. J. Fagg. 640 pages, 8 in. x 11 in., with large map. Bound in flexible fabrikoid. Published by the Traffic Publishing Company, 130 Lafayette Street, New York City. Price, including supplements, six dollars.*

This well-known handbook for shippers of freight (and for everybody interested in freight traffic, either as shipper or carrier) again comes out enlarged, and increasingly justifies its claim that it is a necessary encyclopedia of the traffic department and a recognized authority on traffic procedure. The matter in the book has been entirely reset, with narrower margins, so that although additions have been made amounting to 65 pages, the book is not materially larger than in former years. The rule of using large, clear type is still maintained. The new subjects added this year include: warehousing and distribution; freight consolidation service; pipe-line transportation; foreign parcel post; the federal arbitration act; the home port act; act of congress punishing the unlawful breaking of car seals; embargo regulations; rules of the commission regarding maintenance of records; commission's approved class rate tables, southern class rate investigation. The major changes include those in the traffic glossary, government regulations, parcel post, etc.

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.

Books and Pamphlets

Claims Referred on 11th November, 1925. Decision by National Wages Board of Great Britain on wages and working conditions of railway employees. Appendix, pages 16-47, contains proposals submitted by the Railway companies, the National Union of Railwaymen and the Railway Clerks Asso. 47 p. Pub. by National Wages Board, London, England, 6 *d.*

Employee Magazines in the United States, by National Industrial Conference Board. History, functions, make-up, experiences, together with analysis of 490 employee magazines, 36 of which are published by railroads. 86 p. Pub. by National Industrial Conference Board, Inc., New York City, $1.50.

The Freight Traffic Red Book, 1926, compiled and edited by H. G. Williams and C. J. Fagg. A reference book containing laws and regulations affecting interstate commerce, shipping forms, glossary of traffic terms, lists of abbreviations, rate bases. Carefully indexed. 640 p. map. Pub. by Traffic Publishing Co., New York City, $6.00.

Periodical Articles

Giving Trains a Radio Voice, by O. E. Dunlap, Jr. "Wired wireless is apparently more adapted for service on railroads than is space radio." p. 18. Scientific America, Jan., 1926, p. 18-19.

On the Trail of the Air Mail, by Lieut. J. P. Van Zandt. Map of routes established and routes proposed, p. 5. Illustrated with aerial photographs, some of which show the Lucin Cut-Off and other railroad construction achievements. National Geographic Magazine, Jan., 1926, p. 1-61.

The Potter Plan: A Critical Analysis, by H. T. Newcomb. Annalist, Jan. 1, 1926, p. 5-6.

Railway Signalling Overseas, by H. M. Proud. Impressions of an engineer gained while on a tour of the United States, Australia and New Zealand. Modern Transport, Dec. 26, 1925, p. 3-4.

Relation of Transportation to Purchasing, by H. G. Williams. "Purchasers are concerned with transportation from three standpoints: services, charges, and liabilities." p. 1. Trade and Transportation Bulletin, Jan., 1926, p. 1-2, 9.

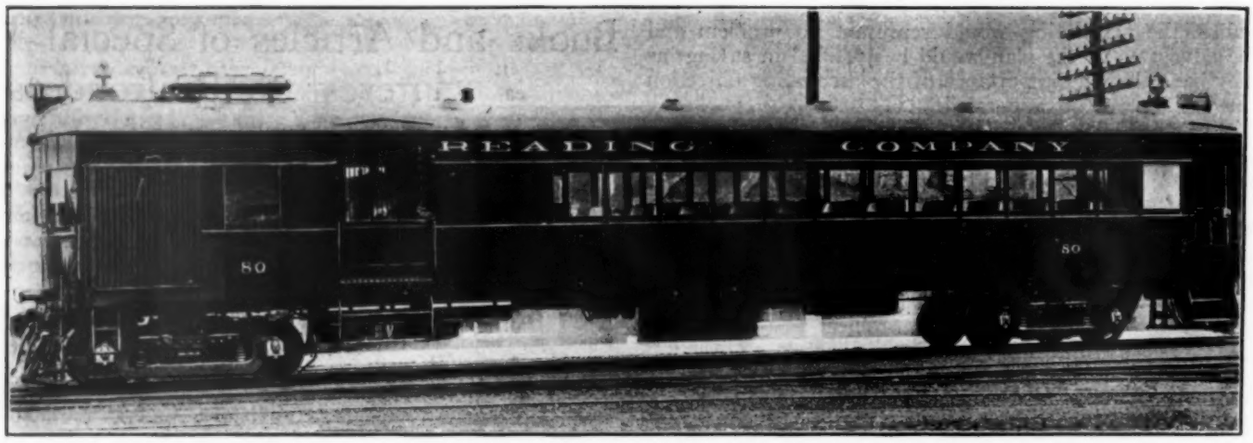
Some Developments in the Electrical Industry During 1925, by John Liston. Railroad motive-power and equipment, p. 21-24; research developments, p. 38-39; radio, p. 39-42; Automatic ry. substations, p. 48-50; lighting, p. 61-67. General Electric Review, Jan., 1926, p. 13-69.

What I Have Learned About Management in the Last 25 Years, by Henry Ford, in collaboration with Samuel Crowther. System, Jan., 1926, p. 37-40, 103-106.

Labor Legislation of 1925. A compilation of laws enacted in 42 States, 2 territories and 2 insular possessions, analyzed by subjects and by States, with a topical index. American Labor Legislation Review, December, 1925, p. 322-357.

Old-Age and Disability Retirement Law for Railway Employes in Brazil, by James A. Rowan. Monthly Labor Review, December, 1925, p. 1-4.

Regulating Public Utility Rates, by William E. Oberle. Comments on statements on earnings of railways presented in rate cases and elsewhere, and on possible results of valuation of railways. American Economic Review, December, 1925, p. 719-720.



Gasoline-Electric Rail Car Which Replaced Two Locomotives and One Coach

The Reading Gas-Electric Rail Car

The car is controlled from either end and can also be used in multiple unit operation

By T. H. Murphy

General Engineer, Westinghouse Electric & Manufacturing Company

A GAS-ELECTRIC car with a luggage compartment and seats for 55 passengers was recently placed in service on the Trenton branch of the Reading. It is capable of high operating speeds with or without trailers. Since being placed in service it has been run approximately 16,000 miles. It gives frequent service between Trenton and the main line connection of this branch of the Reading with New York-Philadelphia trains at Trenton Junction. The total run is 3.7 miles. The service is severe; four station stops are made and operating at times is with a standard trailer. There are grades up to 1.1 per cent on this line. No auxiliary power unit is needed since the car was designed for this service.

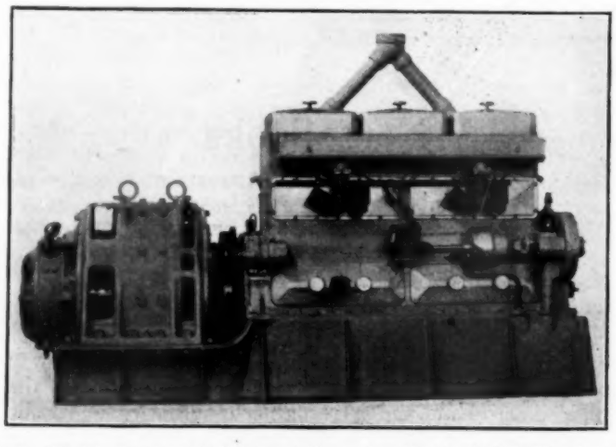
The average schedule time for the one-day trip (Trenton to Trenton Junction) is ten minutes. Layovers at each terminal are from 4 to 10 minutes in duration, giving a minimum round trip of 24 minutes. Without layovers the average schedule speed is 22 miles an hour. A total of 21 round trips is made on week days and 23 on Saturdays, giving an average daily mileage of 170. A 110,000-lb. standard steel coach is hauled on three of the round trips. This rail car is also used for the switching of express cars at Trenton and the transferring of one 73-ton express car from Trenton to a main line train at the Junction.

Mechanical Structure

This one gas-electric car has replaced two Class Q-1, 2-6-4 type steam locomotives and one coach. The locomotives were of special design for operation in either direction and in normal service ran around the cars as the layover time at each terminal was inadequate for turning on a wye. For normal operation of the car no extra movement is necessary as the control is arranged for operation from the rear end and unless a trailer is hauled the operator can run the car from the rear end.

The car was constructed to meet the exacting demands for a smooth riding, high-speed unit. The weight without load, but with all necessary equipment, is 90,000 lb. For operating weight, approximately 10,000 lb. should be added for the average live load.

The car body is of the light-weight steel type, and has straight sides, round ends, arched-type roof, single sash arranged to raise, and is equipped with post castings of spring brass. The underframe consists of a center sill of two 12-inch channels on which the engine generator is mounted longitudinally. Heavy cross members riveted to the center sill support the car body frame. The car body is 60 ft. long over the end sills and 9 ft. 6 in. wide over the posts. The height from the floor to the roof of



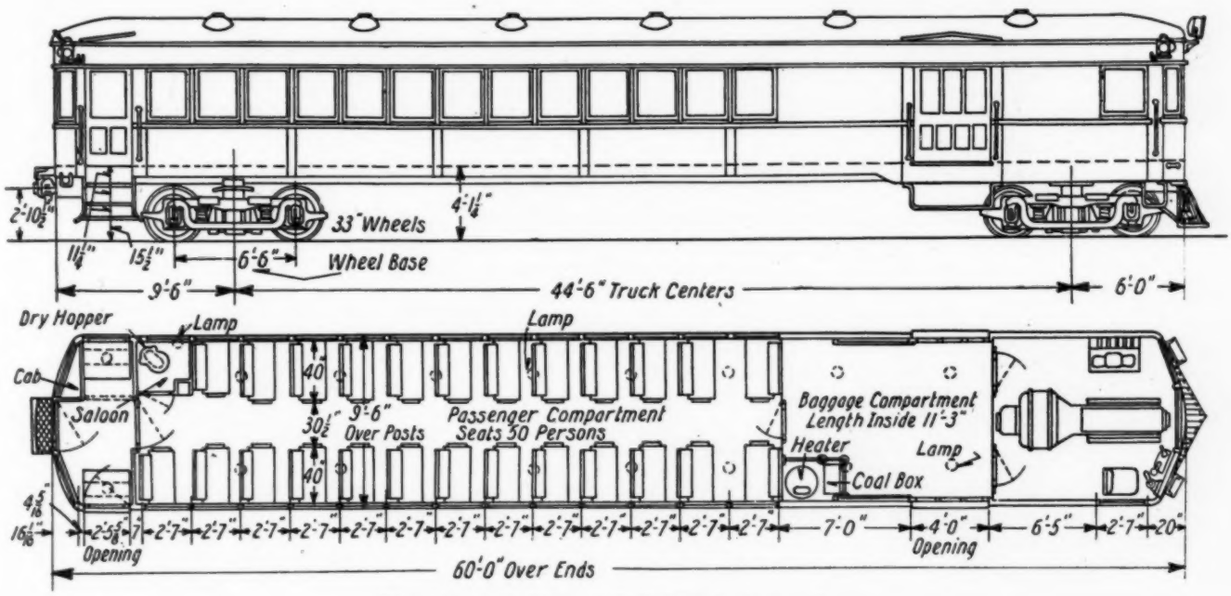
The Motive Power Unit Consisting of a 250 hp. Brill-Westinghouse Engine Driving a 600-Volt Westinghouse Generator and 60-Volt Exciter

the car is 7 ft. 10 in. The over-all height is 12 ft. 3½ in. The engine room, 10 ft. 8 in. long, houses a gasoline engine-generator unit and the control apparatus. A baggage compartment is provided which is 11 ft. long and 9 ft. wide, giving a floor area of almost 100 sq. ft. of which about 16 sq. ft. is occupied by a hot water heater. The main section is a passenger compartment which is 35 ft. 10 in. long and has seats for 50 passengers. The seats are of dark brown imitation leather, 40 in. long, and are spaced 2 ft. 7 in. Steel partitions, with a swing-type door, separate the engine room from the baggage room and the baggage room from the passenger compartment.

The trucks have a fixed wheelbase of 6 ft. 6 in. with 33-in. wheels and are spaced 44 ft. 6 in. between centers. The front pair under the engine-generator set support approximately 60 per cent of the car weight. The long wheelbase and truck center distance and extra heavy trucks were used to give good riding qualities, which are engine speeds. The low speed permits an especially sturdy construction.

The engine has six cylinders, with removable liners and dual heads. It is of the valve-in-head type with two exhaust and two intake valves to each cylinder. The water cooling space around the cylinders is adequate to maintain proper temperatures at all speeds and loads. Trunk type pistons are used with four rings above the wrist pin and one scraper ring. The crankshaft is supported by seven main bearings. It is hollow and arranged so that oil is forced through it to all the main bearings, insuring ample lubrication.

Two complete ignition systems are provided, by means of two high-tension magnetos with impulse starters used with two complete sets of spark plugs. The magnetos are driven independently and are of the single spark type with manual advance and retard regulation. A centrifugal water pump is used for circulating the cooling water. The



Elevation and Plan of Brill-Westinghouse Car

added to by the steel construction used in the underframe posts and side sheeting.

Motive Power Equipment

The motive power equipment consists of a gasoline engine driven generator, two motors, and suitable control apparatus for reversing the direction of the car and controlling its speed. All units were designed with the idea of obtaining simplicity, reliability, and economy in operation. The car weight and service dictated that an engine capable of delivering 250 hp. be used with electrical equipment capable of utilizing the total engine power. The generator and motors are capable of utilizing the full engine power and the flexibility of the control is such that high speeds without trailers or medium speeds with trailers can be obtained.

The engine power output having been determined from the car weight and service conditions to be met, it was a simple matter to design a gasoline engine capable of delivering the desired power at a reasonably low speed along the lines of standard design. The engine has a 7¼-in. bore and 8-in. stroke, and delivers 250 hp. at 1,100 r.p.m. This speed was determined from an engineering standpoint by considering the low weight necessary for such a unit, and also the low maintenance costs that go with low oil pump discharges oil to the lubricating oil header. Fuel is supplied by vacuum feed to the carburetor from tanks located under the car.

Two motors are used for engine starting duty. A ring-gear is mounted on the flywheel, and the motors, with Bendix drive, are mounted one on each side of the engine to mesh properly with the ring-gear. The motors are connected in parallel across the terminals of a 32-volt battery when used to turn the engine over. One motor is capable of bringing the engine up to sufficient speed for firing. The engine cooling water has its temperature regulated by a radiator of the ordinary fin and tube type mounted on the left side of the car. Air is forced through the radiator by a fan, driven by a motor that is connected across the generator whenever the engine is in operation. The quantity of air can be regulated by shutters placed on the radiator.

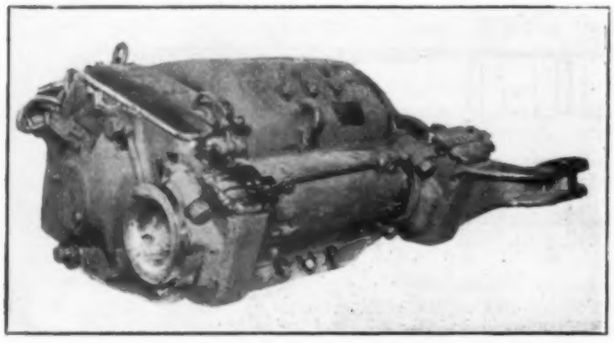
The generator and engine are mounted as a unit on a common bedplate. A flexible disc coupling with four 16-in. discs is used for connecting them together. The complete power unit is mounted longitudinally in the engine room on the center line of the car. The bedplate is mounted on rubber blocks supported from the center sills of the car body.

The generator is of a special type, designed for service

with a gasoline engine in a rail car. An exciter, mounted directly on the shaft of the main machine, is used for exciting the main shunt-field winding and also for supplying power at a low voltage for the car lighting circuits and for charging the battery. The shunt field of the exciter receives its excitation from the 32-volt battery.

Each machine has six poles. The main machine operates at 600 volts with normal load at 1,100 r.p.m. and the exciter at voltages up to 60. The principal feature of design is the constant output characteristic of the generator to prevent overloading the engine. With this design of generator the engine runs at constant speed over a wide range of current values, i.e., a wide variation in car tractive effort. The constant output characteristic was obtained by placing a differential series winding on the poles of the exciter and passing the main motor current through it. This gives variations in field strength that are inversely proportional to the current load. The voltage, therefore, drops off in proportion to increases in current demand and the engine can deliver its full power to the motors at any car speed.

The space and weight limitations imposed by this application demanded that the greatest possible ventilation be obtained with a minimum of extra apparatus. The type of application greatly aided in this, as a one-directional fan could be used on the generator shaft, by which large quantities of cooling air are drawn through the machine. It is located at the engine end of the generator and draws the air in over the commutator which is located



One of the Two Westinghouse 140 hp. Traction Motors

next to the outer bearing. The location of the commutator facilitates brush inspection.

The generator supplies power to two 140-hp. motors located on the forward truck of the car. These are standard 600-volt, direct-current type. They are constructed with solid frames and have openings to permit circulation of air by means of a fan located on the motor shaft. Commutating poles insure good commutation over a wide current range. The motors are axle hung and drive through solid helical gears, having a 16:61 ratio, which are totally enclosed and run in grease. This large gear reduction was used to give the high tractive effort necessary with trailer operation.

Control

The control for the Reading car is simple. Two unit switches are employed for connecting the motors to the generator, and also a reverser for changing the direction of current flow through the motor fields, and hence the direction of car operation. These are of the electro-pneumatic type ordinarily used for equipments of this size. Their operation is governed by a master controller located conveniently to the operator.

The car speed varies with the generator voltage. This is regulated by governing the engine speed, i.e., the engine throttle setting. A sequence drum with a cam is located on the generator with the necessary push rods to the throttle. The position of the cam determines the throttle setting and hence the engine speed. The movement of the drum is regulated by the same master controller that operates the unit switches and reverser. The operator, therefore, has only one control to use for operating the car. The first movement of the master controller closes the unit switches and also a relay that energizes the exciter field. Further movement of the master controller only causes further rotation of the sequence drum, i.e., opening of the engine throttle. All the control apparatus, including a number of knife switches for the motors, generator fields and battery circuits, are located on a rack and panel on the generator.

A battery charging regulator is placed between the variable voltage exciter and the 32-volt battery. An additional regulator is placed between the battery and all 32-volt load circuits. A two-directional ammeter is placed convenient to the operator to indicate battery charge and discharge. An oil gage and an engine tachometer are located on the engine. These are readable from the operator's position.

As the sequence drum determines only the engine speed, it is a very easy matter to operate two or more of these cars from one position. It is but a matter of placing the control wires in parallel and notching up the two drums together. A master controller is on the rear end of the Reading car to permit double-end operation. Where continuous operation of a two-car train is desired a master controller can be placed on the rear end of the trail car and eliminate the necessity of turning the whole unit.

Auxiliaries

Two air-storage tanks under the car provide compressed air for the air brakes, whistles, bells, sanders and the electric-pneumatic switches and reverser. They are kept charged by a motor-driven compressor having a capacity of 20 cu. ft. per minute. This air compressor cuts in and out automatically. Fuel tanks are also located under the car.

The lighting is furnished by a 160 ampere-hour, 32-volt storage battery which is kept charged by the exciter mounted on the engine generator set. This storage battery also actuates two electric starting motors on the engine. Standard regulators hold the lighting and charging voltage constant.

Performance

The car is capable of speeds up to 51 miles an hour and is able to handle a standard railway coach in regular service. The gear ratio on this type of car determines the maximum speeds that can be attained. The balancing speed on the level with the 16:61 gear ratio is 45 miles an hour. A speed of 55 miles an hour is possible with smaller reductions between the motors and wheels.

Orders for similar equipment have recently been placed by the Boston & Maine, New York, Ontario & Western, Pennsylvania, Great Northern, New York, New Haven & Hartford and Erie.

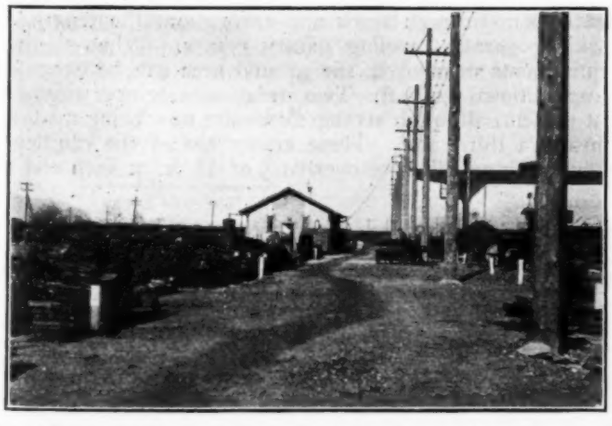
JOHN C. FETZER, real estate dealer, owes the Chicago & Western Indiana the sum of $576,391 with interest for nearly 20 years, according to a decision handed down by the appellate court at Chicago on December 28, in the suit of the railroad for an accounting. The suit originated as the outcome of a $2,764,500 real estate transaction handled by the defendant for the railway. The controversy has been in litigation for nearly 20 years.

Looking West over the Conway Scrap Dock

New Pennsylvania Scrap Dock Saves $100,000 Per Year

Facilities under development at Conway, Pa., reduce scrap costs 60 *per cent*

A REDUCTION of more than $100,000 per year in the cost of handling scrap is among the results which the Pennsylvania is now obtaining from a new scrap handling and reclamation facility, which it has been developing during the past year at Conway, Pa. In



Looking Toward the Bolt and Spike Shop with Recovered Materials on the Left

1923 it cost the Pennsylvania an average of $1.40 per ton to prepare for market the scrap collected on the Central and Western regions, this cost including all expenses, except interest and depreciation, involved in the unloading, sorting and loading-out of all scrap received. During that year the average number of men engaged in scrap handling and reclamation work was 266. In October, 1925, this work was done with 108, or 158 less men, while the scrap handling operations were conducted at a cost of 52.7 cents, a reduction of 87.3 cents per ton or 60 per cent.

This reduction in scrap handling costs is the result of concentrating all scrap handling for the Central and Western regions of the Pennsylvania at Conway and providing there a more modern method of carrying on the work. Prior to 1924 scrap handling in those regions was scattered. Altogether there were 17 points at which such material was accumulated, located as follows:

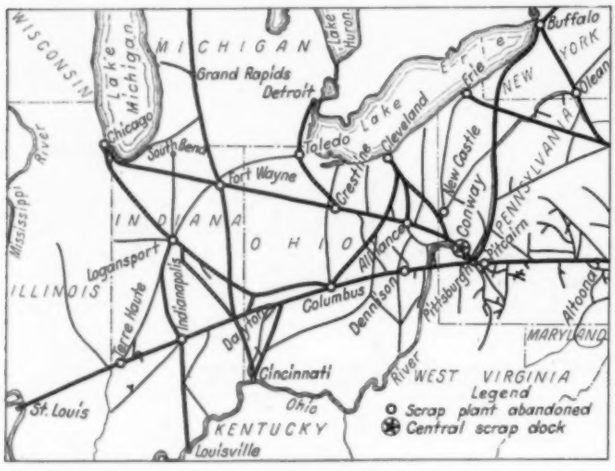
Chicago, Ill.
Fort Wayne, Ind.
Indianapolis, Ind.
Logansport, Ind.
Terre Haute, Ind.
Buffalo, N. Y.
Olean, N. Y.
Alliance, Ohio.
Cleveland, Ohio.
Columbus, Ohio.
Crestline, Ohio.
Dennison, Ohio.
Toledo, Ohio.
Erie, Pa.
Mahoningtown, Pa.
Pitcairn, Pa.
Scully, Pa.

With few exceptions these plants were situated where the bulk of the scrap was produced. In the majority of cases the plants were scarcely more than timber platforms with or without bins for holding the different classes of scrap while awaiting sale and the operations were generally manual except insofar as wheel-barrows were employed to carry sorted material from one place to another. At Pitcairn, Pa., Olean, N. Y., Columbus, Ohio, Ft. Wayne, Ind., and Terre Haute, however, locomotive cranes were employed the Pitcairn plant having had three of these machines in service. These cranes, which constituted practically the only investment in facilities, were utilized to the utmost but it had become increasingly evident that of themselves locomotive cranes did not provide the satisfactory solution of the scrap handling problem. Many of the weaknesses were fundamental in character, involving such questions as increased facilities, more advantageous locations, better supervision and altered policies of administration. It was the study of these questions over several years that finally led to the abandonment

of all of these plants and the building of a single facility for the Central and Western regions at Conway, Pa.

Conway Centrally Located

A number of factors were involved in the choice of Conway as the site of the new scrap center but the principal ones were three in number. On the one hand a study of the scrap market revealed the fact that 80 per cent of all scrap originating in these regions is sold in the Youngstown and Pittsburgh districts. In fact this concentration of scrap sales was partially responsible for the initial decision to centralize the scrap collection work rather than to meet the problem by improving conditions at the several existing plants. With this concentration of scrap sales it was important that any site selected should fall within



The Central and Western Regions of the Pennsylvania, Showing Old and New Scrap Docks

the region. Again, Conway is the site of the Pennsylvania's largest freight classification and storage yard west of Pittsburgh. In such a yard scrap cars could be received with minimum delay and interference to other traffic and adequate and economical switching service assured. With shops, power plant and storehouse at Conway, moreover, and Pittsburgh only 23 miles away, this point was also acceptable from considerations of economy and dispatch in getting repairs made and from the standpoint of supervision. But of the first importance the required ground

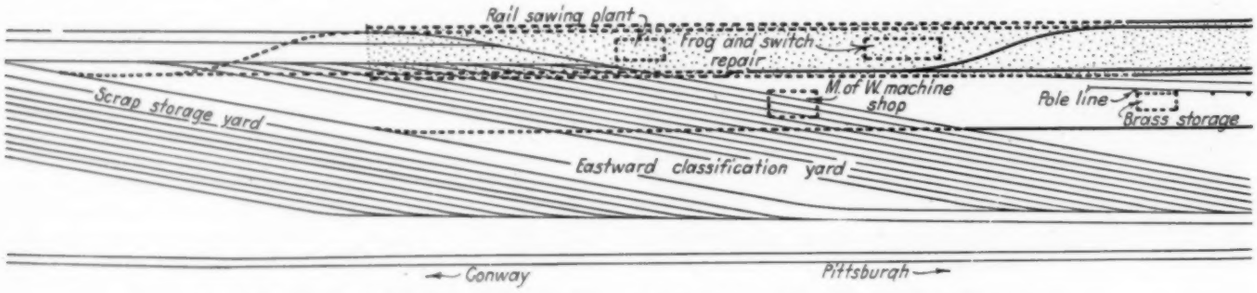
space for present and future needs could be obtained at Conway without cost.

It is eventually planned to have at Conway a complete and thoroughly modern scrap dock, adequate for the handling of all scrap accumulated on the Central and Western regions, with equally complete facilities for repairing and storing all materials gathered from the scrap which can again be rendered serviceable. Consistent with the policy of developing the facility gradually, however, so that in the end the size and equipment of each building, as well as every activity undertaken, will provide the best solution of the road's peculiar problems and so that the road can adjust itself reasonably well to the revolutionary change made in the method of scrap accumulation, the new

40 Cars of Sorted Scrap Ready for Market

facility has only been partially developed up to the present time. As a result the plant presents an unfinished appearance in a number of respects, both as regards its operations and the buildings, which, with the exception of an oxy-acetylene house, are frame sheds. Since the breaking of ground at Conway in November, 1923, however, decided progress has been made in the development of that section of the project devoted to handling scrap, as is shown by the reduction made in the cost from $1.40 per ton to 52.7 cents per ton.

This section comprises essentially a strip of ground 1,550 ft. long and 115 ft. wide, along each side of which extends a through track and throughout the length of which operate traveling gantry cranes. When the requirements demand it, the ground area can be extended an additional 1,000 ft. Two cranes operate over this area at present, although arrangements are now being made to install a third unit. These cranes are of the cantilever type with an effective overhang of 15 ft. at each end to

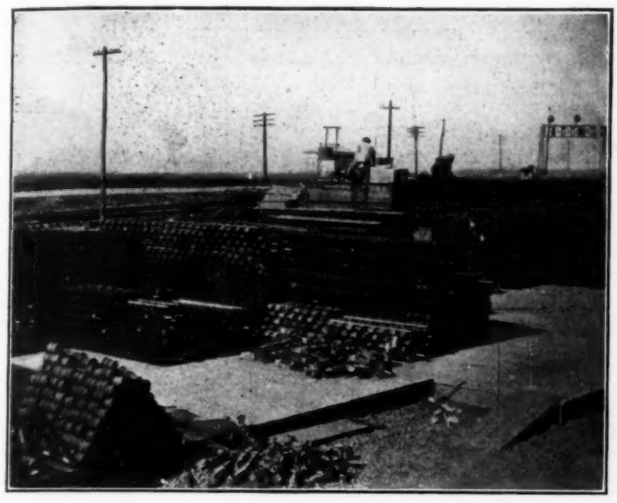


The West End of the Scrap Yard, Showing the Provisions Made for Future Extensions

facilitate the transfer of material from the scrap area to the reclamation area or to serve tracks which may be laid outside the crane runways. But their span has been purposely limited to 85 ft., center to center of runway rails, in the belief that the shorter span would enable the cranes to serve the area more expeditiously and economically.

These cranes are operated electrically from power ob-

tained from a pole line along the scrap dock. They are designed to travel lengthwise of the dock at a speed of 300 ft. per min., to afford movement across the dock at a rate of 250 ft. per min., and to lift at a maximum speed of 60 ft. per min., all of which movements are controlled from a cab hung from the trolley. For lifting purposes each crane



Serviceable Material Recovered from the Scrap

is equipped with a magnet 65 in. in diameter and weighing 8,900 lb. These magnets, which are the largest units obtainable, operate on 69½ amperes of direct current and have an available lifting capacity of 10 tons. This is sufficient to dispense entirely with the necessity of auxiliary hoists to facilitate operations on the dock.

Dock Laid Out in Squares

At first glance the Conway plant presents nothing particularly new in the general plan of its operation. The system in general is one of receiving all scrap in open top cars from which it it removed by the magnets and deposited on the ground where it is sorted into its different classifications simply by having the scrap sorters make separate piles of each kind of scrap as it comes from the central pile, the number of these separate piles and their locations depending entirely upon the kind of scrap in the central pile. Under this arrangement bins are conspicuous by their absence.

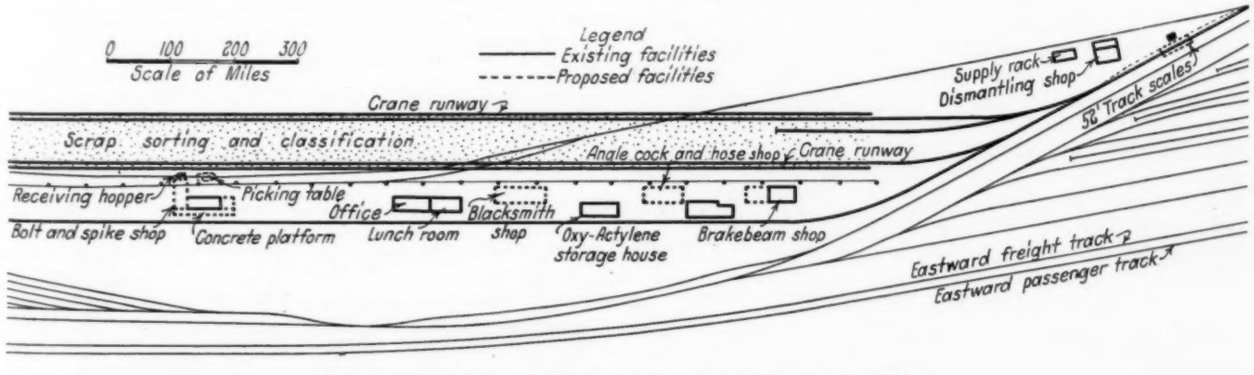
The Conway operations are distinctive, however, in one important respect. The entire area is staked out in squares. These squares are 40 ft. wide and 10 ft. apart and are formed by four posts 4 in. square, which are driven into the ground at the corners of each square, the stakes being painted white and extending about two feet above the ground. The purpose of these squares is to regulate the distribution of material over the dock without at the same time lessening the flexibility of scrap operations. It is permissible to dump only two cars of scrap in any one square, the size of which is such that, when evenly distributed over the area, ordinary scrap will not exceed 18 in. or two feet in depth. This greatly expedites sorting by distributing the piles well over the ground and rendering it a relatively simple matter to extricate the scrap from the center piles without aid from the magnets. Meanwhile the cranes are free to pick up the sorted scrap or repairable material and load it into cars for the market

A Shipment of Brake Beams Leaving the Repair Shop Ready for Service

or to transfer it to the reclaiming plant for repairs, as the case may be.

In sorting the material the Pennsylvania employs its own classification, which differs from the recommended classification of the A. R. A. in confining the scrap to 54 classes, as compared with 81, by omitting some items in the larger classification and consolidating others. All of these classifications are seldom required on the dock; however, some of them, comprising the non-ferrous metals, for instance, are not received at the dock, but are shipped direct from the point of origin to the shops at Altoona, where a large part of such scrap is used for manufacturing purposes.

The cranes handle all scrap entering the yard, with the exception of obsolete car trucks. Because of its specialized character, the work with car trucks, which involves

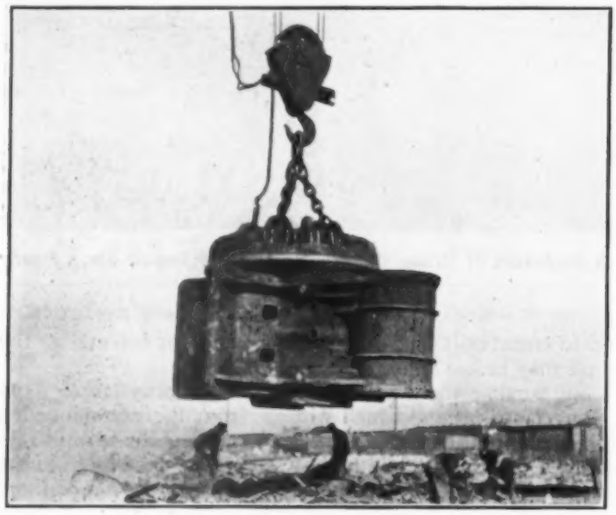


The East End of the Conway Yard, Showing Present Facilities

complete dismantling except for the dismounting of wheels, is carried out at one end of the yard just beyond the craneway but accessible to the movement of a locomotive crane which serves the reclamation area. The method of dismantling these trucks is novel. The facilities, aside from the locomotive crane, consist of a stretch of track which is laid on cross ties about six feet apart. The trucks are placed on this track upside down, which makes it unnecessary for the workmen to crawl underneath the trucks to drive out bolts and pins. An additional feature of this work is that while it is carried out separately from the regular scrap handling operations the scrap dock practice is followed in sorting all truck parts as they are removed so that when the dismantling is completed the scrap is ready for loading directly into cars without further handling.

Twenty-five Cars Sorted Daily

In its present state of development the scrap dock handles an average of from 20 to 25 cars of scrap a day, including the trucks, as many as 40 cars being unloaded on some days. During October 18,362 tons of scrap was handled. As before stated, this scrap was unloaded, dismantled, sorted and reloaded for shipment at a total cost of 52.7 cents per ton, as compared with the cost of $1.40 per ton under the former system. This cost takes into consideration the light, power, material and supplies, and other incidental expenditures met in operating the scrap yard, along with the cost of labor and supervision, but does not include interest or depreciation on the cost of the plant, switching service, or any expense for material and labor devoted to the repair and distribution of salvaged material.



The Magnets Are the Largest Obtainable, Having a Lifting Capacity of 10 Tons

Flood Lights for Night Work

That this tonnage could be handled as easily and economically as it was done, notwithstanding a relatively high labor turnover, is partially the result of performing all unloading at night when the cranes can operate over the dock without interference from sorting activities and without danger to workmen. As an aid to these operations at night two towers were erected in the area, one at each end of the dock, from which electric light is projected over the entire yard. Close attention has also been given to the organization, which is divided into distinct gangs with a seasoned man over each gang, and ample supervision. There are a total of 77 men engaged at present in the handling of scrap, whose expense can properly be charged to scrap handling. Comprising this total are three gang foremen, two maintenance of way and equipment inspectors, six crane operators, four crane directors, and 62 scrap sorters, including the gang leaders, all of whom work under the direction of the general foreman of the plant.

While the maintenance of way and maintenance of equipment inspectors are included in this organization they have duties somewhat at variance with the rest. These men neither sort scrap nor supervise scrap operations but instead are assigned the work of inspecting all cars of material before they are unloaded and during the process of sorting, a practice which results in the recovery of much serviceable material from scrap and affords a check upon the carefulness with which scrap is loaded at points of origin.

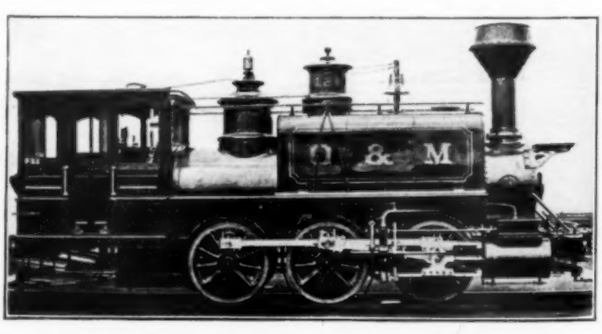
The work of scrap handling and also the reclamation work is done by mechanical department forces, with the jurisdiction of the stores department, in general, extending to the custody of materials when they are available for distribution.

Reclamation Confined to Recovery and Repair

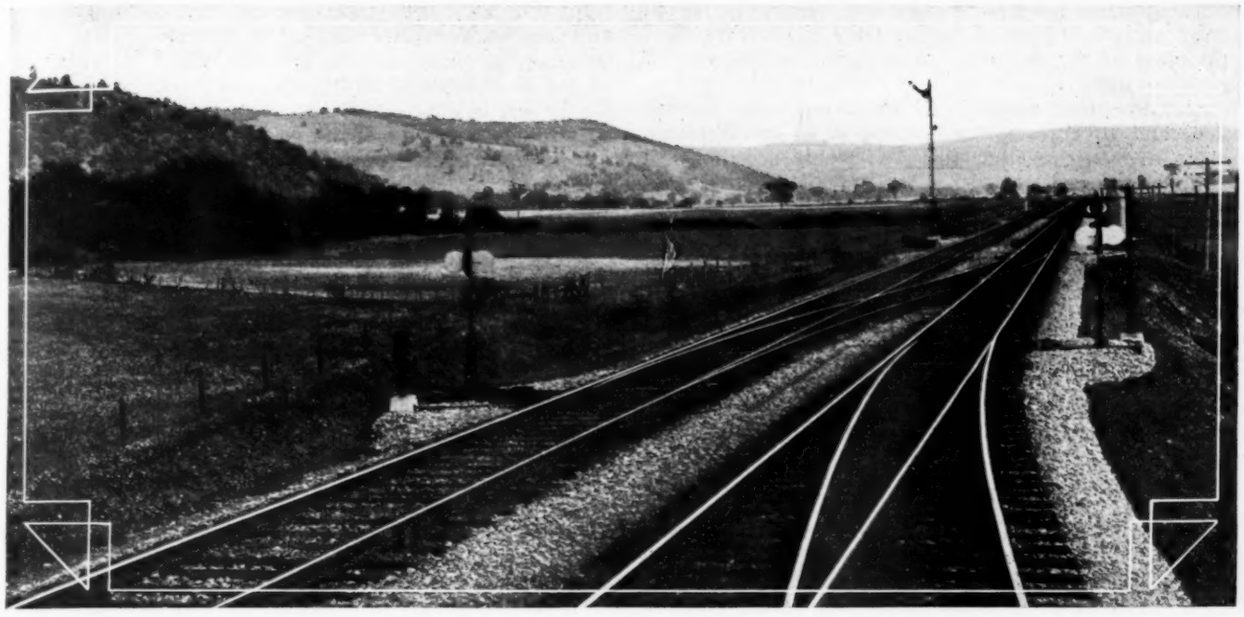
The reclamation plant occupies a strip of ground lying along one side of the scrap dock where it is served on the one side by a gantry crane and on the other by a track on which cars can be loaded with outgoing shipments. Up to the present the activities in this area have been confined to the storage and distribution of serviceable material recovered from the scrap and to the repairs of brake beams, straightening and rethreading bolts, etc.

While only partially developed, the reclamation area at present is not without interesting features. The entire plant is laid out with a view to large scale operations and from the character of some of the machines already installed, including a large press with which it is intended to renew the threads of track bolts, an operation which it has been impossible to do with bolt-cutting machines, it is expected that reclamation operations at Conway will eventually be placed on a par with the scrap handling facilities. The improvements in immediate contemplation comprise, principally, new structures and the necessary equipment for repairing most of the items of repairable material that may come to the dock in the scrap.

When the employees engaged in this reclamation work are included with those engaged on the scrap dock the total force, including supervisors, is enlarged to 108 men. While this force may require expansion with increased operation it is significant that the amount of work now being handled at Conway formerly required 266 men. This reduction in force is attributed almost entirely to the increased efficiency of present over former methods.



Built in 1880 by Brooks for the Ohio & Mississippi



Typical Track, Showing High Standards of Maintenance

Systematic Protection of Ties Effects Marked Economies

Careful selection, thorough treatment and reduction of mechanical wear increase life

By E. F. Robinson
Chief Engineer, Buffalo, Rochester & Pittsburgh, Rochester, N. Y.

PRIOR to 1910 no treated ties were used on the Buffalo, Rochester & Pittsburgh and the ties were of yellow pine from the South, and white oak from West Virginia and from points local to the line in Pennsylvania. The increasing price and uncertainty of the tie supply led to favorable consideration of the establishment of a timber preserving plant to treat all cross and switch ties, and such bridge timber, including piling, and other timber as might be required for miscellaneous use. It was the expectation, which has been practically borne out, that the operation of an independent timber preserving plant, located on the line of road would result in building up a continuous supply of local ties and that the treatment of ties would make it possible to use successfully beech, maple, red oak and other kinds of timber which, without treatment, are unfit for cross ties.

A careful study of the entire situation was first made, consideration being given to the available supply of ties, class of timber to be treated, location of plant, design of plant and capacity, character of treatment, storage and distribution, production of ties after treatment, and records.

The Timber Available for Ties

A survey was made of the standing timber in the territory within several miles on each side of the line, which pointed to the conclusion that there would be no difficulty in securing sufficient ties of beech, birch, maple, red oak, pin oak and others of the red oak family to meet the requirements for years to come. The former practice had been to accept ties 8 ft. 6 in. in length and of various sizes, both sawn and hewn but in order to secure uniform treatment and uniform spacing of ties in the track it was decided to revise the specifications for ties to be treated and accept locally only ties sawn on four sides, 7 in. by 8 in. by 8 ft. 6 in. and continue to accept hewn Southern pine ties 7 in. by 9 in. by 8 ft. 6 in.

With the thought in mind that if decay has once started, preservative treatment cannot restore the timber to a condition of soundness and that money spent in treating timber which has even incipient decay is largely thrown away, great care has been taken in the selection of ties for treatment, excluding all which show any evidence of decay. Great care has also been taken in piling the ties, both on the right of way and at the timber preserving plant to avoid any condition favorable to decay or fungus growth. The first year after commencing to accept beech, birch, maple and other hard wood ties for treatment it was found that under certain conditions fungus growth appeared on the ties if they were allowed to remain piled on the right of way at the place of delivery for any great length of time. Dealers are, therefore, required to load all ties for shipment to the timber

preserving plant as fast as they are delivered and inspected, with the object of having the ties properly piled at the plant for air seasoning under careful supervision of the organization.

Some time was required to work out with the tie dealers and to enforce our present rigid specifications for ties to be treated but this was finally accomplished and up to the end of 1916 a local supply of ties sufficient to meet requirements, for both construction and maintenance, had been built up. In 1917, however, conditions changed rapidly and the supply of local ties practically stopped, due largely to labor shortage and war conditions and it has been necessary to rely largely upon sap yellow pine ties purchased in the South for construction and maintenance requirements since 1916. This condition is, however, gradually improving and it will doubtless be possible to bring back the tie supply to points on the line and tributary to it within the next few years.

The Treating Plant

It was considered advisable to locate the timber preserving plant at a central point on account of distribution and as suitable land was available at Bradford, Pa., it was decided to locate it at that point, which is a fairly central location. While a large portion of the ties to be treated comes from the south end of the line, making it necessary to back-haul treated ties for the territory south of Bradford, this does not work any hardship as empty cars on the way to the mines are loaded with ties, which avoids back-haul of empty equipment.

The plant, which has one treating retort, 98 feet long, with a capacity of about 250,000 ties per year, was erected and put in service during the summer of 1910 at a cost, including tracks but not including land, of $70,000. Improvements to the amount of $30,000 have since been added, consisting principally of the extension of tracks to serve the storage yards. In laying out the plant, careful consideration was given to the location and design of loading platforms, the provision of adequate space for tie storage with good air circulation for seasoning and water supply for fire protection.

After investigating the different methods of treatment throughout the country it was decided to adopt the full cell creosoting process on the basis of ten pounds of creosote oil per cubic foot of timber as being most likely to prove economical, having in mind the injection of sufficient creosote into the ties to preserve them for a long period; the full effect of this treatment to be insured through proper handling and protection of the ties against mechanical wear after treatment. The record of results so far obtained, which is referred to further on, fully justifies this practice.

For the first two or three years after the plant was put in operation a considerable variety of ties was accepted for treatment, including beech, birch, maple, red oak, pin oak and others of the red oak family, cherry, hickory, sycamore, chestnut, elm, etc., but finally as a result of careful investigation and experience it was decided to accept for treatment only beech, maple, red oak, black oak, pin oak, water oak and others of the red oak family, hickory, cherry and also yellow pine sap ties from the South, the local supply being made up mostly of beech, maple, red oak and pin oak.

As previously noted, it was found advisable to have all ties which are to be treated shipped to the plant for storage and seasoning as fast as they are delivered. These ties are piled in standard piles and are seasoned from six to eight months, mainly the latter period. Various original and independent tests and studies have been made from time to time to determine the rate of seasoning of different woods under varying conditions and the effect of steaming on subsequent air seasoning. It is the aim so far as practicable to have a year's supply of ties on hand; that is, the ties purchased in the summer and fall for use during the following year are piled up for seasoning and are treated through the fall and winter months as fast as they are ready. The different classes of timber are separated into groups as they are unloaded or as they are loaded on trains, grouping being made according to the manner in which the timber will take treatment as experience, tests and studies in treating have demonstrated. All hardwood ties which show any indication of checking are protected with check irons to prevent splitting, the irons usually being driven into the ties immediately after they are unloaded and piled for seasoning. It was found from experience that under certain conditions fungus growth or stain would appear on the ends of ties, particularly maple, when piled for seasoning at the timber preserving plant. When such ties were cut it was found that decay had started in the interior. In order to overcome this trouble the practice was adopted of painting the ends of all hardwood ties with hot creosote as soon as they were piled at the plant for seasoning.

In order to make room at the plant for storage, some of the treated ties are shipped out during the fall months to be piled on station grounds, where they can be easily loaded by the section men for distributing in the spring. During the summer months the piles of treated ties on the right of way are covered with a layer of earth to prevent rapid drying out but during the winter months these piles are left uncovered.

Extreme care is taken in the handling and protection of ties after treatment. In beginning the use of treated ties it was found necessary to start a campaign of educcation among the track men as to the proper handling and protection and to guard against any kind of damage which would tend to shorten the life of the ties. Very careful handling of treated ties is required and the practice of throwing them over the sides of cars on top of each other in piles is forbidden as well as the practice of throwing them down embankments promiscuously when distributing them for renewals. The use of tongs is required in pulling ties into the track and the use of shovels, picks or any other tools for this purpose is strictly forbidden. The use of spike mauls or other tools for "bucking" the ties around in the track is also prohibited.

As sawed ties generally do not require adzing for the tie plates and as hewn ties are adzed at the plant before treatment, it is not necessary for the track men to use an adze on them when they are originally put in track, but as the tie plates settle into the ties it is necessary to adze them to some extent when laying new rail, regaging, or rolling rail in on curves.

Every treated tie placed in the track on tangent or curve, is plated with Goldie shoulder tie plates, the size of the intermediate plates being 5/8 in. by 7 in. by 9¾ in. and the joint plates being 5/8 in. by 7 in. by 10 in. These plates are applied to the ties, using the Ware tie plate gage and surfacer before the ties are placed in the track. The main tracks, both tangent and curves, are now almost 100 per cent tie plated. When it is necessary to pull spikes, the holes in treated ties are plugged with creosoted tie plugs and hot creosote is poured into the spike holes before driving the plugs, the man driving the plugs being provided with goggles to avoid injury to his eyes. When it becomes necessary to adze treated ties the cut surfaces receive a brush treatment of hot creosote oil immediately. Any treated ties damaged by derailments are adzed off immediately and given a brush treatment of hot creosote on the adzed portion. The object of all these precautions is to prevent, so far as is possible, the breaking of the

outer treated shell which protects the interior of the tie.

Considerable time has been required to educate track men to this extent and constant attention is still required to enforce the rules. It is evident, however, that proper protection of treated timber is required if a long life is to be secured and unless this protection is afforded the high cost of treatment in the first place is not justified.

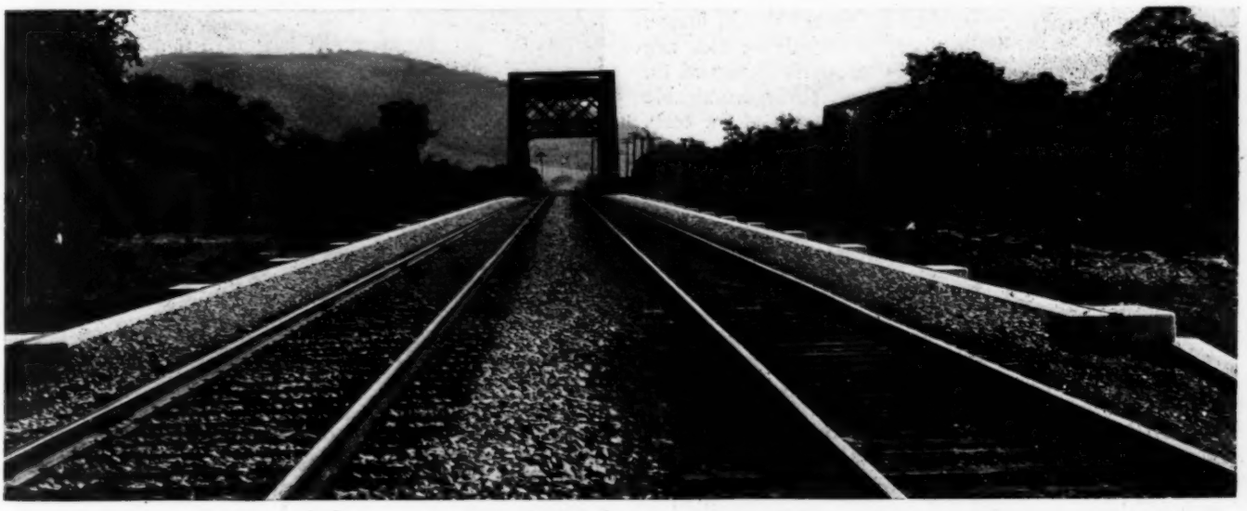
A complete system of records and accounting is in use at the timber preserving plant, records being kept in detail of the treatment and disposition of every run of ties and timber. Records are also kept of all experiments made to determine the time required for seasoning, proper grouping, amount of absorption and other factors upon which the successful treatment of ties largely depends. In fact, a complete history is kept of every run from the time the ties arrive to the time they leave the plant.

In order to have a continuous record of the service of treated ties, a galvanized nail indicating the kind of wood is applied to each tie at the timber preserving plant and when the ties are placed in the track a dating nail, showing the year put in track, is also driven into the tie. Section foremen are required to submit daily reports showing the number of ties of each kind of wood put into the track between each mile post and a book record taken from these cards is kept in the office of the chief engineer. When treated ties are taken out of track for any cause whatsoever, the foremen are required to make a report, giving sufficient data as regards location, etc., to make it possible to trace out the life of the ties removed.

All treated ties taken out of track for any cause whatsoever, unless they are entirely destroyed, are shipped immediately to the timber preserving plant for inspection by the superintendent of the plant and the engineer maintenance of way. With each shipment of such ties the superintendent of the plant is furnished with a complete history of the ties removed, including location, kind of timber, date removed, reasons for removal, etc. Any such ties that, upon inspection at the plant, are found to be fit for further use are turned over to the roadmaster at Bradford for use in side tracks at selected locations and a record is kept so that their life may be followed up.

The timber preserving plant has now been in service 15 years and there are in track approximately 1,800,000 treated ties, including cross ties and switch ties, and about 200,000 ties treated with zinc chloride which are not discussed here. Most of these ties are in our main tracks and important branches which tracks are now approximately 75 per cent tied with creosote treated ties. The first and second years after the plant was put in service, on account of the shortage of ties, it was necessary to treat some ties, mainly beech and maple, before they were thoroughly seasoned and a few of these ties are now showing some evidence of decay. The proportion of treated ties so far taken out of track on account of decay is, however, practically negligible.

For a number of years prior to the installation of the timber preserving plant a method of tie inspection before renewal was worked out and has been followed ever since with gratifying success, resulting in uniformity, economy and a better distribution of ties throughout all tracks. Early in the spring special tie inspectors, reporting direct to the division engineers, go over the line and mark all ties for renewals and ties are not distributed for renewals until this inspection has been made. The inspectors are required to do their work independently of the judgment of the section foreman or the roadmaster but the foreman is required to accompany the inspector to point out to him any local conditions which should properly influence his judgment in marking ties. After the inspection has been completed the inspectors follow up the work of renewing ties throughout the season, checking the ties removed against the inspection and seeing that treated ties are properly dated and that all other requirements as to the use of treated ties are fully lived up to. These tie inspectors are men who have been trained as section or extra gang foremen and are selected as inspectors on account of their ability and fitness for the work.



These Tracks Handle Heavy Traffic

When the treatment of ties was begun in 1910, in spite of the fact that there was already a considerable amount of technical information available, it was realized that independent tests and studies would have to be made upon which to base a practice and method most suitable to local needs. The importance was also realized of determining accurately the success of the treatment of the different varieties of ties available from their actual service records. In view of the fact that the Buffalo, Rochester and Pittsburgh is a comparatively small railroad, resulting in the possibility of distributing treated ties with considerable uniformity in all main tracks, it was determined to keep an accurate record of the life history of each individual tie treated and put in track rather than to base conclusions upon results obtained in comparatively short stretches of test track. In other words, due to the size of the line and other local conditions, the entire main track of the railroad may be considered as test track. We have been very successful in having all treated ties put in track

under practically uniform conditions, which is a necessary requirement not only to insure reaping the utmost benefit from the practice of treating but to make possible an accurate comparison of the success of treating and using various different kinds of timber under normal service conditions, which are affected by climate, ballast, drainage, weight of rail, wheel loads, curvature, etc.

Soon after the plant was put in operation a series of tests was made to determine, first, the relative suitability for treatment of the various kinds of timber available, and second, the proper grouping of different kinds for treatment to insure the best possible uniformity of penetration and absorption. These tests were made by treating runs of various kinds of timber, both separately and combined, the treatment being carefully supervised to insure uniformity of method and each individual tie being weighed before and after treatment.

A study of the results of these tests, supplemented by the careful examination of samples and borings made from treated ties of the various test runs, verified the original conclusion that the full cell treatment of ten pounds of creosote per cubic foot of timber would insure the maximum life of the timber, provided the ties are protected from mechanical wear by properly designed tie plates, and at the same time would be entirely practicable with the choice of woods available. A study of the tests also indicated the proper grouping of varieties of woods during treatment to allow of treating in the same run, ties of relatively equal permeability.

The grouping finally adopted is as follows:

1. Long leaf yellow pine (heart grade).
2. Sap yellow pine.
3. Beech and hickory.
4. Hard maple, soft maple, cherry.
5. Red oak, black oak, pin oak and others of the red oak family.

Only ties of the same group are treated in the same run.

Due to the fact that some woods are much more refractory than others, it was found necessary to modify to some extent the decision to treat all ties with ten pounds per cubic foot and the practice finally adopted is as follows:

Beech and hickory are treated with ten pounds per cubic foot or, failing this, the treatment is carried to refusal.

Sap yellow pine is treated with ten pounds per cubic foot.

Maple is treated with ten pounds per cubic foot, or failing this, the treatment is stopped after 12 hours.

Red oak and other oaks of the red oak family are treated with ten pounds per cubic foot or, failing this, the treatment is stopped after 12 hours.

Yellow pine bridge timber is treated with ten pounds per cubic foot; the time of treatment being determined by the condition of the timber, proportion of heart wood, etc.

Air Seasoning Studied Carefully

Studies of the rate of air seasoning of ties were made by weighing groups of ties of the same species of wood when received green at the plant and at frequent intervals thereafter until the loss of weight indicated that the ties had fully seasoned. The ties on which the seasoning tests were made were kept piled in standard piles, the same as all other ties received at the plant, and piled for seasoning and in the same location so that the tests were conducted under the practical working conditions of the plant.

The conclusions drawn from these tests are as follows:

In general, practically complete air seasoning under conditions existing at the plant is completed in a period of about six or seven of the spring, summer and early fall months, the ties losing from about 14 to 29 per cent of their original weight during that time.

If late fall or winter months intervene during the process of seasoning the result is seriously retarded. Seasoning not only stops during these months but the ties actually gain moisture, resulting in additional time being required in good seasoning weather to complete the seasoning.

While most kinds of wood complete their seasoning in about seven months of good weather, there is generally some further loss of weight for a period of several months longer but as the rate of this additional seasoning is so slow, it is not practicable to attempt to take advantage of it. Furthermore, it is probable that decay of ties takes place much more rapidly during the last half of the period of air seasoning than at any other time. Therefore, for practical results it is best to treat ties as soon as they have reached the degree of seasoning indicated by the first minimum point of the curves shown in the diagrams.

The Track Is Well Tied

In our opinion preliminary steaming of ties is a doubtful expedient, liable to do more harm than good and should not be resorted to except where the time available will not admit of the natural process of air seasoning.

The practical success of the use of treated ties is amply demonstrated. The ultimate justification for the use of treated ties is the longer service life of such ties over untreated ties. For a number of years prior to the use of treated ties the average renewals had been in the neighborhood of 200 ties per mile of main track each year. Soon after the use of treated ties was begun the renewals per mile began to decline each year until at present an average of only 95 ties are renewed per mile of main track each year. All of the lines carry heavy traffic and are maintained in first-class condition as to ties. In particular, on the line between Indiana Junction and Butler Junction the proportion of curves to tangent is unusually large and the curvature and traffic are heavy. There has been no change in the policy governing tie renewals during the period in question except that the process of replacing cinder ballast with stone in important heavy traffic territory has resulted in a heavier program of tie renewals in these locations than would have resulted if less track each year had been raised out of face and reballasted.

The practical results obtained from the use of treated ties is very strikingly shown in the percentage of ties removed to those put in, and the small percentage of treated ties which have been removed from track for all causes after a service of 14 years. The service record of all ties points to an ultimate average life of more than

25 years for all treated ties used in main track and this is, of course, far in excess of the average life of untreated ties. The fact that comparatively few treated ties have been removed so far for other than accidental causes is evident that no mathematically exact estimate of the average life expectancy can be made at the present stage of our experience. The general conclusions as to expected life have, however, been checked up and are supported by a very careful field examination of many thousand ties now in track.

Results Amply Justify Treatment

The method of treatment and use of treated ties which has been followed is justified by the results attained. The object of treating ties is to prevent decay and to permit the use of woods well adapted for ties if decay can be prevented but which, without treatment, are entirely unfit for use. There are in track many treated ties which show more or less evidence of decay and which may eventually be removed for that cause, but close inspection of a large number of such ties selected for special observation shows little or no change in their condition from year to year, pointing to the conclusion that such ties will give good service in track indefinitely and may ultimately be removed for some cause other than decay. In most of the cases referred to the cause has been traced to incipient decay started in the tie before treatment or to ties having been treated before they were fully seasoned. A large proportion of the ties now in track which show any evidence of decay are those treated during the first two years of operation of the plant when, as above noted, conditions as to supply and seasoning of ties were not as fully under control and the methods of inspection not so well organized and careful as subsequently.

Along with proper methods of treating ties must go proper methods of using them, as explained earlier in this article. The life of any treated tie would be comparatively short if used in track without tie plates, and in consideration of the expense of treating ties and putting them in track the use of the best obtainable kind of tie plate is fully justified. The thickness and size of the tie plates have been increased from year to year as traffic and wheel loads have increased. Contrary to frequent suggested objections to the Goldie tie plate, our experience has proved that they cause absolutely no damage to treated ties, nor do they hasten deterioration.

Native Hardwoods Most Satisfactory

The most satisfactory woods to treat for ties are the native hardwoods local to our lines such as beech, maple, red oak and hickory. These woods take treatment sufficiently well to insure preservation against decay and show a comparatively small proportion of failure from checking combined with a high resistance to mechanical wear. Considering only those ties of which there are more than 10,000 now in track, those which have so far had the least number of renewals on account of decay only are: gum, pine, red oak, black oak, maple, beech, pin oak, hickory and chestnut in the order named, the ties removed in comparison to those placed in track being in the proportion of 7 per 100,000 in the case of gum and 70 per 100,000 in the case of chestnut, these being the extremes.

Making a similar comparison of ties of which there are more than 10,000 now in track and considering all except accidental causes of removal, the proportion of renewals to those in track is found to be in the following order: pine, gum, pin oak, maple, hickory, red oak, black oak, beech and chestnut, the ties removed in comparison to those placed in track being in the proportion of 122 per 100,000 in the case of pine and 10,476 per 100,000 in the case of chestnut, these being the extremes.

Considering removal due to accidental causes (wrecks and derailments) the large percentages of ties removed for that cause are among the pine, chestnut, beech and maple. It should be borne in mind that the accidental causes of tie failure are purely a matter of chance and this should be given full consideration.

The treated pine tie, while satisfactory so far as resistance to decay and standing up well against mechanical wear on tangents and light curves is concerned, is not suitable for heavy curvature and has a low resistance to damage or destruction by derailments. These ties must be secured from the South with consequent increase in initial cost of the tie due to freight rates. For these reasons, therefore, they are not generally satisfactory as compared with the native hardwoods.

The same objections except source of supply apply with even greater force to the treated chestnut ties. These ties are entirely unsuitable for main track use, even under comparatively light service conditions. The treatment of chestnut ties was discontinued some years ago for these reasons and we continue to use them untreated only in comparatively unimportant side tracks where service requirements are light. About 80 per cent of the treated chestnut ties removed from track on account of mechanical wear are found to be fit, by turning them over, for re-use in side tracks where the traffic is not particularly heavy and in such locations they will last indefinitely.

General Track and Traffic Data

The main tracks of the Buffalo, Rochester and Pittsburgh are laid with 90 lb. and 100 lb. A. S. C. E. section rail in the following proportions:

THE NUMBER AND KIND OF CREOSOTE TREATED TIES PLACED IN AND REMOVED FROM MAIN TRACK

Kind of ties—	Creosoted ties placed in main tracks	Ties removed and cause of removal from main track: Decay (1)	Wrecks, derailments (2)	Broken, split, checked (3)	Mechanical wear (4)	Replacements, turnouts, etc. (5)	Total creosoted ties removed
Tamarack	971	...	1	...	...	...	1
Elm	9,669	3	47	28	5	1	84
Red Oak	95,763	6	689	213	70	35	1,013
Black Oak	40,461	3	278	113	18	19	431
Pin Oak	10,740	1	10	25	2	5	43
Maple	219,528	18	3,715	541	63	273	4,610
Beech	240,634	22	2,490	761	112	73	3,458
Birch	9,086	...	91	35	...	4	130
Cherry	4,188	...	20	17	18	3	58
Gum	11,196	...	29	19	10	1	59
Chestnut	61,727	43	1,201	1,967	4,456	62	7,729
Hickory	29,583	8	60	71	8	2	149
Pine	523,460	15	3,618	526	99	257	4,515
Ash	574	...	.....	1	1	...	2
Unclassified	1,219	...	430	.....	.....	...	430
White Oak	201	...	.....	.....	.....	...	.....
Total	1,259,000	119	12,679	4,317	4,862	735	22,712
Percentage	100.000%	0.009%	1.007%	0.343%	0.386%	0.059%	1.804%

100 lb..... 75 per cent
90 lb..... 25 per cent

Fifty-two per cent of the ballast in main tracks is crushed stone or slag and 48 per cent is cinders. The maximum traffic density for the years 1908 to 1924 inclusive occurred in 1918 when 6,629,000,000 gross tons were moved one mile.

The alinement of main track is 35 per cent curve and 65 per cent tangent, on some divisions the proportion of curvature is as high as 47 per cent with curves ranging as high as 10 deg., several 8 deg. curves and numerous 7 deg. curves. Heavy power is used on practically all parts of the line as indicated by the wheel loading of the following types of engines:

Pacific.	Weight of Engine (Without Tender).....	267,000 lbs.
Mikado.	Weight of Engine (Without Tender).....	280,000 lbs.
Mallet.	Weight of Engine (Without Tender).....	445,000 lbs.
Mallet.	Weight of Engine (Without Tender).....	569,000 lbs.

As ours is largely a coal carrying railroad, the greater part of the freight tonnage is handled in 50-ton and 70-ton steel hopper cars.

Joint Meeting of Regional Advisory Boards

THE efficiency in transportation which has developed since the formation of regional advisory boards was described at the first joint national conference of the 12 shippers' regional advisory boards of the United States, held at the Blackstone hotel, Chicago, on January 7 and 8. The purpose of the conference was to consider the inter-related problems of organization and policy in the conduct of the various boards and to devise means for the co-ordination of activities whereby even further improvements may be made in the relationships between shippers and the railways, and in the quality of transportation service furnished by the carriers.

Receipts from California grapes in the New York terminal district increased over $5,000,000 through an arrangement made by the Atlantic States Shippers' Regional Advisory Board and the railways for the delivery of California grapes in the New York terminal district 3,400 miles away, according to Donald D. Conn, manager of public relations of the Car Service division of the American Railway Association, in his opening remarks. A total of 20,000 cars of grapes, or over 34 per cent of the total California production this year, were handled through the co-operation of all concerned in the New York terminal district without any embargoes whatever, as contrasted with the receipt of less than 12,000 cars in 1923 with sucsive embargoes on all lines.

"On the other hand," he said, "there is in this country an area of 100 miles square which produces over one-half of the total agricultural wealth of the state in which it is located. Shipment of the entire product of this area covers only three months of the year. The marketing of this product could be extended in orderly fashion to six months. It is now distributed through 154 unrelated marketing agencies. There is no intelligent relationship between volume of production and market consumption. Three different grades of product are marketed under one brand. You may ask where railroad transportation has any relation to this condition. The answer is, that if this product had been distributed as efficiently in a similar manner as is done by its principal competing area, the distribution could have been done with approximately 25 per cent less cars in the service. We shall never adjust a situation of this nature by law, but it can be done by the intelligent public opinion of that area through some organization which has for its purpose the common good of the producer and the community as a whole. Brains, confidence and faith, plus a definite organization through which the community can function, can solve that very situation. The fundamental reason for the existence of the shippers' regional advisory boards is to function in the behalf of the transportation needs of each district. The Northwest Regional Advisory Board, which was the first one organized, was created as the direct result of a distinct transportation necessity. This is likewise the reason for the recent organization of the Florida division of the Southeastern board. This is, indeed, the practical purpose of the movement, but there is something inherent in this affiliation of the public and the carriers which is more basic and which is of far greater consequence. I refer to the probability of conducting the functions of the advisory boards on such a high plane of accomplishment and of developing the principle of voluntary co-operation between every phase of agriculture, industry and trade so that the vast majority of all relations with the carriers and the shippers may, in the not distant future, be settled at home. I hope, in so far as our railroad relations are concerned, that in the future we may substitute the power of intelligent and informed public opinion, always flexible to meet the changing conditions, for the rigid power of statutes.

"A still greater objective which I can see in this relationship is represented by the practical good which can come from a closer local association between the representatives of all phases of agriculture, industry and trade. One of the basic rules of procedure in the shippers' regional boards covers the question of distribution. I am thinking now primarily of agriculture. The soil is the greatest of all factories and the farmer is its operator. His production affords a large measure of all that goes to sustain our industries. His purchasing power is an important factor in every market. His attempts to secure better distribution for his products, his concern over market conditions and the need for relating the problems of the producers of the same commodity in different competing territories, are equally the concern of the railroads and other industries. As regards a majority of the distribution problems of agriculture, the best results can and have been accomplished by territorial associations of common interest where the local problems of the people are not overlooked, but where the intelligent and informed opinion of every phase of industry is brought to bear upon the solution of the difficulties of any one economic group.

"The reports of business conditions prepared by the regional advisory boards, if utilized to their fullest extent, will aid every industry and banker as well as the railroads, to discount the future. When you reflect upon our great complex of production, markets and competition, think of what a tremendous contribution can be made by the regional boards when each one is able to say to the business of their territory: 'Here is a complete picture of the production and economic conditions in your district, and here is a guide for the next ninety days'. That this can be accomplished is assured by the reports of over 50 per cent of the committees which may now be considered as accurate indices of subsequent conditions. When business and the railroads are able to discount the future for all commodities, as it has been possible for many of your committees to do for their own, there will be no excuse for our periodical cycles of inflation and depression, for panics, or for excessive transportation surplus or car shortage. Business and operating conditions on railroads, like business and operating conditions in other industries, are extremely sensitive to uncertainties. There should be none, when we discount the future."

Train Control Installations Approved

I. C. C. reports on National Safety Appliance Company device on three roads—Regan system finally approved

WASHINGTON, D. C.

THE Interstate Commerce Commission on December 31 made public orders which it had adopted on December 8 approving, with certain exceptions, the installations of the National Safety Appliance Company's intermittent magnetic induction type of automatic train-stop with forestalling feature on the Houston division of the Galveston, Harrisburg & San Antonio; the Western division of the Pacific system of the Southern Pacific, and the Southwestern division of the St. Louis-San Francisco, finding in each case, as a result of inspection and test, that the installation meets the requirements of the commission's specifications and order, except as noted.

The commission also issued a supplemental report after reinspection of the installation of the Regan Safety Devices Company's system on the Chicago, Rock Island & Pacific, finding that all of the eight situations which it said in its original report should be corrected have now been corrected and that all requirements have been met.

G. H. & S. A. Report

The National device was first placed in service on the Galveston, Harrisburg & San Antonio between Rosenberg, and Randon, Texas, 6.2 miles, with six equipped locomotives, in January, 1924. Field work was started in July, 1924, for the extension of the installation on the main track from Randon, Texas, to Glidden, Texas, a distance of approximately 44.5 miles. As in the first part of the installation key-bys were provided at home signals, and circuits were provided in connection with distant signals so that an automatic brake application would not occur when such signals were passed in the caution position below a prescribed speed. These circuits were later removed and a forestalling device installed.

The installation inspected and tested was completed on January 11, 1925. It extends from Rosenberg, Texas, to Glidden, Texas, 50.7 miles, single track; 38 locomotives equipped.

"At our request," the commission says in its report, "the carrier furnished figures showing the cost of the completed installation. It is understood, of course, that the cost of installing the same device upon any other carrier's road will in all probability be different because of the different number of locomotives to be equipped, the number of track magnets and accessories, etc. The inclusion, however, of the cost figures as compiled by the carriers and vouched for by them in each case as installations are completed and reported upon will furnish data from which conclusions may be drawn as to the comparative cost of the various types of devices under a great variety of operating conditions. They are valuable for this purpose and we deem it pertinent and in the public interest to set them forth in this and subsequent reports upon completed installations."

The cost of this installation as reported by the carrier covering wayside equipment and locomotives, is as follows:

1. Total cost of the train control installation, less signals and cost of change in existing signal system, less salvage—$56,892.03.
2. Total cost of changes in existing signal system made necessary by train control, less salvage—$21,716.65.
3. Total all other costs, if any.—None.
4. Total cost of installation (train control)—$78,608.68.

The automatic signal system throughout this territory is overlapped. It was installed in 1908 and consists of normal clear, two position, lower quadrant, home or distant or home and distant double case ground semaphore signals on concrete foundations. The signals are U. S. & S. Co. style B, approach electric lighted. Red, yellow and green are the night indications for stop, caution, and proceed, respectively.

Operation

The automatic train stop system operates as follows according to the description given in the report: At a clear signal or magnet location.—When the track and line circuits provide for a clear signal or magnet and an approaching locomotive enters the track magnet section, the neutralizing coils of the track magnet are energized, depressing the free magnetic field so as to prevent the actuation of the control valve, and so permit the locomotive to proceed without an automatic application of the brakes.

At a stop or caution signal: When the track and line circuits provide for a stop or caution signal and an approaching locomotive enters the track magnet section, the neutralizing coils of the track magnet are not energized, and a free magnetic field exists. When the inductor planes of the control valve pass through the free field of the track magnet a magnetic flux is induced in the duplex control valve, or receiver magnets, which neutralizes the normal holding effect on the armature of the valve magnet having a polarity opposite to that of the track magnet, with the result that the armature is released; the operation of the locomotive apparatus being as follows:

Main reservoir air in the chamber of the stop valve is exhausted to atmosphere. Brake pipe pressure in the stop valve forces the application valve from its seat and vents brake pipe air to atmosphere. By this same action the check valve is seated, blanking the supply of air to the brake pipe and preventing the engineman from manually releasing the brakes, thus causing an automatic brake application which persists until the locomotive stops.

Release after automatic brake application: After the locomotive has passed beyond the free field of the track magnet and has come to a stop, the lever of the release cock may be moved to the release position. This action closes the lower plug cock, cutting off communication between the stop valve and the duplex control valve, and vents to atmosphere any remaining air acting on the control valve stem. Gravity assisted by the valve magnet then replaces the armature and reseats the valve stem. While the lever is in this position the upper plug cock opens the connection from the double heading cock, which vents brake pipe air to atmosphere, and should the lever be left in this position the continual exhausting of the air will result in a brake application. After the lever has been in the release position for a moment, it must be restored to the running position to effect a release of the brakes.

Forestalling: When the track and line circuits provide for a stop or caution signal and an approaching locomotive enters the track magnet section, the neutralizing coils of the track magnet are not energized and a free magnetic field exists, which will initiate an automatic brake application when the control valve passes over the magnet. If the engineman is alert he may forestall this automatic brake application by placing the handle of the forestalling valve in the forestalling position a short time before passing over the stop magnet. After the handle of the forestaller has been in the forestalling position for a predetermined time, approximately 20 seconds, it automatically drops to the normal position. This feature makes it necessary to forestall or acknowledge at each succeeding stop magnet.

Double heading: In double heading, or pushing, all locomotives, except the one from which the brakes are being operated, must have the standard double heading cock closed and the release cock handle in the double heading position to prevent undesired automatic brake applications.

Exceptions

As a result of this inspection and test, it is found that the installation meets the requirements of the commission's specifications and order, except as noted below, and it therefore is approved except as hereinafter indicated:

1. The track magnet displacement test indicated that with an active magnet in a certain position between the rails (i.e., its sides parallel with the track rails and four inches or less therefrom) an automatic brake application would not be initiated upon the passage of a locomotive. That is, a track magnet could be displaced without resulting in an automatic brake application at a signal indicating stop. All track magnets should be so connected that in case of displacement or removal, a stop signal indication and an automatic brake application will result at the next signal in the rear.

The railway company is expected to comply at once with all of the above-stated requirements.

The railway company will be expected to comply with the

following requirements as to inspection, tests and maintenance:

1. The ball check and needle valve of the forestalling valve, when not properly adjusted, result in improper timing of the forestaller, and trouble has been experienced in keeping this valve properly timed. A ball out of round, or a blow past the leather, tends to shorten the timing, while dirt or certain improper adjustment of the needle valve tends to lengthen the forestalling time. While the shortening of the forestalling time may result in undesired stops any excessive lengthening of the time, on the other hand, may render it unnecessary to acknowledge at succeeding stop magnets. It is considered important, therefore, that the inspection shall be such that any variation from standard adjustment will be promptly detected and the cause promptly removed.

2. The clearances in the valve assembly of the duplex control valve are such that accurate machining of all parts is necessary, and freedom from dirt, oil, gum, moisture, etc., must be maintained to prevent false clear failures. In this connection it is suggested that it may be found profitable to consider such changes in design as will provide greater clearances; i.e., clearances less susceptible to interference from accumulations of the character named.

3. Careful adjustment of the control valve magnet armatures is essential to a proper operation of the device. Improper adjustment by means of shims may render the armature so sensitive that it will release from the pole pieces too easily, resulting in undesired brake applications, or held too forcibly against the pole pieces might result in failure to initiate a brake application.

4. Should the duplex control valve strainer or the connection between the stop valve and duplex control valve be stopped up by accumulations of scale, dirt, ice, etc., false clear failures would result. Adequate means should be provided for preventing this condition from developing.

5. Detailed systematic and periodic inspection and test of the locomotive equipment by a carefully trained maintenance force is necessary and this was apparently being given when the inspection was made by our engineers.

6. Arrangements should be made for careful inspection and test of the train stop equipment on all locomotives operated in train stop equipped territory upon arrival at and before departure from designated inspection and repair points. This inspection and test should include all parts of the apparatus, and all seals should be inspected to see that they are unbroken and that the apparatus is properly cut in service. A daily report as to the condition of the apparatus should be made on a form provided for that purpose and forwarded by the inspector to a designated officer.

7. Periodical inspection and test should be made to insure that there has been no deterioration of the magnetic qualities of the track magnets, reports being made on a form provided for that purpose and forwarded by the inspector to a designated officer.

8. A form should be provided for and used by each engineman in reporting failures of the apparatus and any irregularities in the operation of the device. All such information should be reported in detail.

Certain situations were noticed which, in our opinion, should be corrected by the railway company as a precautionary measure in order to secure a greater degree of safety and to prevent a possible failure properly to protect train operations in so far as is concerned the signal system upon which the train stop device is superimposed.

The railway company should promptly take the necessary action to carry into effect the following specific recommendations:

1. The magnet relay control should be carried through the signal circuit breaker.

2. With the home and distant arms on the eastward and westward home signals at Eagle Lake held in the clear position with a train occupying the track in advance which is governed by these signals, a false clear magnet will result at these signals and the distant signals in the rear. The controlling circuits for these magnets should be so arranged as to correct these conditions.

3. The staggered signals between sidings are located so close to each other that should opposing trains leave such sidings under clear signals automatic brake application at these staggered stop signals might not prevent collision. The braking distances at these and other points should be carefully considered with a view to insuring adequate braking distances.

4. The type of fouling protection employed at sidings and crossovers should be given careful consideration with a view to possibly providing increased protection.

5. The factor of safety should be increased by the installation of switch boxes on the hand thrown derails, and switches at siding end of crossovers between main track and side track.

6. The control for automatic distant signals should be such as to insure that these distant signals will indicate caution, and the magnets at the distant signals indicate stop, should the home signal stand falsely clear due to mechanical trouble or sleet.

While these recommendations do not reflect upon the train control device itself, we feel that as a matter of precaution the carrier's attention should be called to them and that it should comply therewith in order that the greatest degree of safety may be insured.

The Galveston, Harrisburg and San Antonio Railway is expected promptly and currently to inform us as to the progress made in conforming to all of the above-stated requirements and recommendations.

The California Installation

This device was first installed on the Southern Pacific in June, 1919, at which time a magnet was temporarily placed in the track near Sacramento, Calif., for test purposes. In November, 1921, a test section was installed between Hayward, Calif., and Halvern, Calif., comprising 4.5 miles of single track with eight track magnets with three equipped locomotives. Tests were conducted on this section by the Southern Pacific Company until March, 1924. This installation was under joint observation by representatives of the commission and the American Railway Association from September 18, 1922, to January 31, 1923.

In August, 1924, a preliminary inspection was made by representatives of the Bureau of Signals and Train Control Devices on a test section on the Western division between Bentwood, Calif., and Tracy, Calif., 20.8 miles, with 12 equipped locomotives, and a report as to the results of this inspection was made to the carrier on December 18, 1924.

The installation inspected and tested was completed June 8, 1925. It extends from Oakland, Calif., to Tracy, Calif., a distance of 75.6 miles, of which 24.5 miles is double track and 51.1 miles single track. There are 98 equipped locomotives.

The cost of this installation as reported by the carrier covering wayside equipment and locomotives as hereinbefore described, is as follows:

1.	Cost of train control installation, less signals and costs of change in existing signal system, less salvage	$181,448.00
2.	Cost of signal system installed in connection with train control, less salvage	5,901.00
3.	Cost of changes in existing signal system made necessary by train control, less salvage	118,912.00
4.	Total cost of installation (Items 1, 2 and 3)	306,261.00

The signal system throughout this territory is overlapped. It was installed in 1908 and consists of normal clear, two position, lower quadrant home or distant or home and distant semaphore signals. The signals are U. S. & S. Co. style "B," approach electric lighted. Red, yellow and green are the night indications for stop, caution and proceed, respectively.

The requirement as to track magnets made in the G. H. & S. A. report is also made as to the Southern Pacific and also two additional requirements:

2. Release cocks should be so constructed and so connected as to result in a brake application when the handle is turned in position to nullify an automatic brake application.

3. Should the condensers which bridge the relay contact points break down and short, a false clear failure would result. These condensers should be removed or so arranged that a short will result in a stop operation.

The Southern Pacific Company will be expected to comply with the eight requirements as to inspection, tests and maintenance stated in the other report with the addition of two others:

9. The forestaller should be sealed with an identification seal where it is attached to its bolting flange to detect unauthorized adjustment.

10. The duplex control valve should be sealed with an identification seal to detect unauthorized adjustment.

Recommendations similar to these in the other report are also made with the addition of the following:

5. With the home and distant arm on signal 52L at Shellmound interlocker and the home arms on signals 1 and 12 at Port Costa interlocker held in the clear position with a train occupying the track in advance which is governed by these signals, a false clear magnet will result at these signals and

the distant signals in the rear. The controlling circuits for these magnets should be so arranged as to correct these conditions.

6. Track magnet protection should be provided braking distance in the rear of signals 311 and 312 at Port Costa.

7. Due to laying of heavier rail some track magnets were found not to be level with the top of the rail. This should be corrected.

St. Louis-San Francisco Report

This device was first placed in service on the St. Louis-San Francisco between Nichols, Mo., and Brookline, Mo., five miles, on April 16, 1923, and was extended to Logan by September 15, 1924, a distance of 20 miles with 22 equipped locomotives. The 20-mile installation provided for a train-stop system with limiting speed restriction of 25 miles an hour when the automatic block signals at head block locations indicate caution. A preliminary inspection of this 20-mile installation was conducted in October, 1924, and a report as to the results of this inspection made to the carrier on November 18, 1924. The forestalling apparatus was first installed on engine 4130 in October, 1924, and the balance of the engines were similarly equipped by May, 1925.

The installation inspected and tested was completed on June 30, 1925. It extends from Nichols, Mo., to Monett, Mo., 40 miles, of which 35.6 miles is single track and 4.4 miles double track. There are 31 locomotives equipped with the device.

The cost of this installation as reported by the carrier covering wayside equipment and locomotives, is as follows:

> "The total cost of the work between Monett and Nichols is $98,353.68. This covers the train control wayside equipment and the cost of equipping engines, but does not include the block signals as signals were installed in this territory several years ago."

The automatic signal system on the division was installed in 1910 and consists of the Union Switch & Signal Company's normal clear three-position, upper-quadrant oil-lighted style S low-voltage electric ground semaphore signals, which are over-lapped and controlled by track and polarized line circuits. Red, yellow and green are the night indications for stop, caution and proceed, respectively.

The company is expected to comply at once with the following requirements:

1. The new style duplex control valve in service on 27 of the 31 locomotives should be substituted for the older type of valve having fluted stem with full length bearing and stop yoke as in service on four locomotives when inspected.

2. Five failures were noted in which no automatic brake application was initiated while passing a track magnet at a caution signal at a rate of speed in excess of the prescribed rate of 25 m.p.h. This was due to the speed control relay picking up too soon, which in turn allowed the magnet control relay to pick up and energize the neutralizing coils of the track magnet. The picking up of the speed control relay was due to the speed control circuit not being properly adjusted, there being too little resistance used in the external circuit. These speed restriction circuits are unreliable in operation as shown by test and should be removed.

3. The track magnet displacement test indicated that with an active magnet in a certain position between the rails, (i.e., its sides parallel with the track rail and four inches or less therefrom) an automatic brake application would not be initiated upon the passage of a locomotive. That is, a track magnet could be displaced without resulting in an automatic brake application at a signal indicating stop. All track magnets should be so connected that in case of displacement or removal, a stop signal indication and an automatic brake application will result at the next signal in the rear.

4. Should the condensers which bridge the relay contact points break down and short a false clear failhre would result. These condensers should be removed or so arranged that a short will result in a stop operation.

The requirements as to inspection, tests, and maintenance are the same as those in the Southern Pacific report.

The railway company is expected promptly to take the necessary action to carry into effect the following specific recommendations:

1. The results of braking tests indicate that the question of adequate braking distance should receive careful consideration.

2. The magnet relay control should be carried through the circuit breaker on the signals in the section Nichols to Logan in a similar manner to that observed between Logan and Monett.

3. With either the top or the middle arm of the eastward home signal at Nichols held in the clear position with a train occupying the tracks within the interlocking limits governed by this signal, a potential false clear magnet will result at signal 2422. Also, a cross in the "loop" line wire circuit for this magnet will produce a false clear condition under certain conditions. The controlling circuit for the magnet at Signal 2422 and the loop line wire circuit should be so arranged as to correct these conditions.

4. At Monett the east end of the crossover is normally set for a crossover movement. The shunt boxes on this crossover shunt only one track circuit. It was shown that this crossover could be fouled by a train on the eastward track with the westward signal and the magnet indicating clear conditions. This should be corrected.

5. The factor of safety should be increased by the installation of a switch box on the hand thrown derail protecting the main track at Hazeltine.

6. A revision of the short track circuit sections at intermediate signal locations and at approach magnets for head block signals, Nichols to Brookline, would appear desirable in order to make uniform the entire installation.

7. The type of fouling protection employed at sidings and crossovers should be given careful consideration with a view to providing increased protection.

8. The roadside installation should be frequently checked with the circuit plans to insure that they are accurate. This is considered especially important in view of the numerous changes being made in the roadside installation.

Nickel Plate Arguments Heard by I. C. C.

WASHINGTON, D. C.

THE Van Sweringen application for authority for the unification of the Chesapeake & Ohio; Erie; Hocking Valley; and the New York, Chicago & St. Louis, through acquisition of control and lease for 999 years by a new New York, Chicago & St. Louis company, was finally submitted to the Interstate Commerce Commission on December 31 after four days of oral argument before the full commission with the exception of Commissioner Woodlock, who has not participated in this proceeding because of his former connection with the Pere Marquette, and Commissioner McChord, whose resignation as a member of the commission became effective on January 1. The application was filed with the commission on February 21, 1925, and the evidence in the case was presented in a series of hearings before Commissioner Meyer and Director Mahaffie of the commission's Bureau of Finance which began on April 15.

The argument on behalf of the applicants was made by W. A. Colston, general counsel of the Nickel Plate, and Newton D. Baker, as counsel for O. P. and M. J. Van Sweringen, while the opposing argument was made by Henry W. Anderson and Thomas B. Gay for the Scott committee representing dissenting stockholders of the Chesapeake & Ohio, E. C. Bailly, representing dissenting stockholders of the Hocking Valley, and Albert I. Stiles, an intervener on behalf of C. & O. stockholders. The good faith of the entire transaction was attacked by counsel for the C. & O. minority, who declared the entire plan to be based on the desire for promoters' profits rather than on transportation considerations, while Mr. Bailly confined himself to asking better terms for the Hocking Valley stockholders and took no position on the question of public interest. Moultrie Hitt, representing the New York & Pennsylvania, a short line connecting with the Erie, asked the commission in its order to protect the interests of that road. Because many of the commissioners were not familiar with the many details of the

testimony the arguments were frequently interrupted by questions from the bench as to various provisions.

There was some discussion of the question of the jurisdiction of the commission, because of the position taken by the protestants that the proposed unification amounts to a consolidation such as could not be permitted until the commission has completed a final consolidation plan, which counsel for the applicants met by pointing to the difference between a lease for any term and an outright sale and by showing that the plan contemplates the maintenance of the separate corporate identities. They not only contended that the commission has complete jurisdiction but included in it the considerations, terms and conditions of the proposed acquisitions of control, which they had invited the commission to give the closest scrutiny. Commissioner Hall said he could not see that the commission has any jurisdiction to step in and adjudicate rights as between directors and stockholders.

Mr. Anderson and Mr. Gay took the position that the entire transaction is illegal on the ground that the Chesapeake & Ohio directors had acted in the interest of the Van Sweringens and in violation of their obligations as trustees to their stockholders, to which Mr. Baker replied that the court decisions to which they referred related to secret transactions of trustees in dealings with trust property for their own interests, whereas he said that the transactions under consideration were made openly in the form of an invitation on the part of the Van Sweringens to place a proposal before the commission for its approval, which had been agreed to by a majority of the stockholders, and that the commission had been especially requested to examine closely the terms proposed.

Mr. Anderson described the plan as the "rawest" he had ever seen and cited figures which he said showed that the Van Sweringen interests would make profits of over $100,000,000 from the entire transaction beginning with their purchase of the Nickel Plate. Mr. Colston and Mr. Baker not only criticized many of the figures used but said that to the extent they represented profits from the increased market value of stocks they had been participated in by other stockholders in the same proportion. Mr. Anderson said the plan presents "every phase of the economic evil in the railroad situation today," and represents "one of the most sinister forces ever experienced in American life," the power of promoters, fiscal agents and syndicate managers who elect directors and manipulate properties for their own interest. He assumed, he said, that the commission would not assent to a plan involving such "corrupt and inequitable elements" and that it could not, in his opinion, approve the plan subject to conditions because that would amount to the commission's promulgating a plan of its own on which no hearing had been held. He said that only about 8 per cent of the traffic handled by the roads involved is interchanged between themselves and that the plan had been conceived without reference to considerations of transportation or the public interest until the applicants began to prepare their testimony for the hearing; also that most of the witnesses had not been arranged for until after the cross-examination of J. J. Bernet and T. C. Powell, the first witnesses for the applicant.

While Mr. Anderson did not directly charge that the New York Central is interested in the plan he said that whenever the Van Sweringens got into a crisis "the New York Central was standing right there" and that as they dealt with the same bankers he had reached the conclusion that there was a close relation. If the plan goes through, he said, the Van Sweringens will make an absolute net profit through manipulation of securities and real estate transactions of $86,361,765, to which he added another item of over $16,000,000, which would go to stockholders of the Nickel Plate, and under the trust agreement entered into by the Van Sweringens, which Mr. Baker referred to as a quasi-testamentary contract, Mr. Anderson said that the Van Sweringen interests would control the voting rights of the entire system for 21 years after their death, even if they should sell the beneficial interest in the stock.

In concluding his argument Mr. Anderson told the commissioners that he had been told almost daily by men high in the economic and political life of the country that the plan is backed by interests so powerful that it is bound to go through, however well-founded the opposition, but he asked the commission to disapprove it as "founded on transactions which the law considers fraudulent, and as unreasonable to the public and grossly inequitable to the stockholders."

Mr. Baker in reply said that the charge of disregarding trustee obligations and the estimate of profits were not intended for the commission but "to fly out of the window to the millions who cannot read the nine thousand pages of evidence" and he denied that there was a scintilla of evidence in the record on which to base the charges that bankers and promoters are to profit or that the New York Central is in any way interested. He said that the relations with the New York Central that have been mentioned in the record are "only the most normal inter-railway relations." He cited the large increases in the market price of many railway securities in the past two years to show that the profits made by the Van Sweringens from their purchases of stock were not especially abnormal.

In reply to the contention that a 999-year lease amounts to a consolidation, Mr. Baker pointed to the many cases in which the commission has approved that form of acquisition of control under paragraph 2 of section 5 of the act, and said that a lease for 999 years with provisions for termination in certain contingencies cannot be considered as of longer duration than a purchase of stock which is also provided for in paragraph 2. He also said that the commission does not have to hazard all on its judgment now because under paragraph 3 it may issue supplemental orders. When Commissioner Eastman asked if the commission could later transfer the C. & O. to another system, Mr. Baker said he was not certain that Congress had given the commission power to go beyond allocating a line to a system for the persuasive effect of the commission's plan, as it had not given the commission power to force the adoption of any system. He referred to this case as representing the first real trial of the consolidation provisions of the law and said it was unfortunate that it should have been so beclouded with charges of fraud, but he pointed out that the commission itself had approved the election of Nickel Plate directors as directors of the Chesapeake & Ohio and said that common directors are of every-day occurrence and are "much better than dummy directors."

When Mr. Baker spoke of his impression that a certain fact was in the record but said that he could not recall exactly where he got that impression, Commissioner Aitchison remarked that it may have come from the same place as the statement so often published in the newspapers that the commission is deadlocked as to its decision in this case.

Mr. Colston in his closing argument referred to most of the charges made by Mr. Anderson as "hocus-pocus" interjected into the record only by "insinuation and innuendo". When questioned as to whether the commission should insert in its order a condition giving it the right to set aside a lease afterward Mr. Colston said that it could undoubtedly re-open the case and undo any decision it might make now by supplemental order but he urged that no such condition be inserted which would seem to create uncertainty at the outset.

J. H. Hustis Resigns Presidency of Boston & Maine

Will leave Boston & Maine in April—Remarkable improvement in road's earnings—Successor not yet appointed

JAMES H. HUSTIS, president of the Boston & Maine since 1914, except for the period of federal control when he was district director of the New England roads, has resigned. The resignation is not to become effective until the annual meeting of the stockholders in April. Mr. Hustis proposes then to go abroad for a rest. A committee of the board of directors has been appointed to name his successor.

Mr. Hustis has been the head of one or another of the three principal New England roads for a period of almost 20 years. He received his training in the operating department of the New York Central. His first association with a New England carrier was in 1907, when he was appointed assistant general manager of the New York Central's leased line, the Boston & Albany. He was promoted to the position of vice-president of the New York Central in charge of the Boston & Albany in 1911. The New York Central had been unable to operate its new property efficiently and the public was extremely critical of the unsatisfactory service. This situation was taken in hand by Mr. Hustis and before long corrected in such an eminently successful fashion as to cultivate favorable public opinion and high regard for Boston & Albany service on the part of the shippers.

J. H. Hustis

Mr. Hustis' record, both from the standpoint of the improvement effected in the Boston & Albany's operating efficiency and of the good standing he had with the New England public, was the reason for his being called to the New York, New Haven & Hartford in September, 1913, following the close of the unpopular Mellen regime. Mr. Hustis served as vice-president for one month, and then until July, 1914, as president. The split-up of the New Haven system under the terms of the so-called Federal Consent Decree of 1914 resulted in his being transferred, still in an executive capacity, to the Boston & Maine, of which he became president on August 15, 1914.

Mr. Hustis' 11 years with the Boston & Maine have been years of great and varied vicissitudes. The road has undergone the experience of federal control; it has been in receivership, was reorganized, is now about to be reorganized a second time. It has been Mr. Hustis' misfortune to have had to go through with all these things, and there must have been many times of great discouragement. However, recently the Boston & Maine has had a phenomenal renewal of its earning power, such that its net railway operating income, which was $2,987,415 in 1923, was increased to $8,972,022 in 1924 with about 5½ million less gross. In the first 11 months of 1925, with an increase in revenues, the road had net railway operating income of no less than $10,644,573, or 35 per cent over the same period last year. Net income after charges in the 11-month period was $4,425,516. To complicate the situation there has been the necessity of meeting highway competition, the necessity also of studying the possibility of abandoning non-lucrative branch lines. Abandonment proposals are never liked by the communities which will be deprived of service. The leading problem, therefore, in such cases is to show the necessity for such abandonments, and at the same time, in so far as possible, to continue favorable public attitude towards the road. Mr. Hustis has always been singularly successful in fostering and maintaining a favorable public opinion.

In asking the board of directors of the Boston & Maine not to consider his name for re-election at the forthcoming annual meeting, Mr. Hustis said he felt that the improved operating and financial results in 1925 made his retirement possible at this time, although similar requests which he had made in recent years were withdrawn each time at the suggestion of the board.

With the financial reorganization of the Boston & Maine at the point of completion, with service at high standards, and with prosperous results for 1925 assured, Mr. Hustis in his letter said he felt justified in asking that he be now relieved.

Mr. Hustis' letter said in part:

"When the term for which I was elected president expires in April next, I desire to retire from the service of the railroad, and ask that my name shall not be considered for re-election.

"You will recall that on two previous occasions I made a similar request, but was then persuaded to remain under conditions which do not now exist.

"While the final figures for December will not be available for

some weeks, it is apparent that the financial showing for the year will indicate results that are most gratifying.

"The relations existing between the public and the management, and the relations existing between the management and its employees, have never been more co-operative or helpful than at present. The physical condition of the property was never better than now, and it has been stated recently, with good reason, that the service rendered is giving general satisfaction.

"The pending financial reorganization and other matters of major importance have now reached a point where my own participation in the management is not needed.

"Under all the circumstances, and after nearly 48 years of continuous service, I feel that I am now warranted in allowing myself a measure of leisure to come and go and do, free from all official responsibilities.

"It is needless, I know, to tell you how much I have valued your friendship and support, which have in no small measure contributed to the results which I feel have been accomplished. It would be difficult for me to state my indebtedness to my colleagues in the service, and to the employees generally, but their devotion to your property is an asset not to be expressed in words."

The executive committee of the board of directors, in a statement announcing that it was acceding to Mr. Hustis' request, said in part:

"Mr. Hustis has several times in recent years desired to be relieved of the heavy responsibilities and burdens of his position, but until now the position of the road has been such that the board of directors have been able to prevail upon him to continue. Mr. Hustis now feels that after 11 years of service conditions have reached the point where he can in fairness to the company, the stockholders and the public ask for the relief to which he feels that he is entitled. The executive committee with real regret has acceded to Mr. Hustis' request.

"The 11 years during which Mr. Hustis has been President of the Boston and Maine have been years of extreme, if not unprecedented, difficulties. * * * In spite of these difficulties and those incident to the great growth of motor transport and industrial depression, there have been marked improvements in operating, in service, in the position of the railroad in public opinion and in employees' morale, under Mr. Hustis' management

"More than $50,000,000 has been expended in improvements and betterments during these 11 years, the result of which is beginning to be felt in the better service and increased net earnings of the past two years.

"It is impossible at this time to make any adequate statement either of the difficulties or the accomplishments of Mr. Hustis' management. But it should be said that the executive committee believes that the high standing of the Boston & Maine with the public, with other railroad and with the governmental authorities, is in large part due to the standards which Mr. Hustis has always set and insisted upon.

"The greatly improved showing of the railroad in 1925 is the result of the years of work which Mr. Hustis has given, and which have been such as to entitle him to the relief which he has decided he must have after 48 years of incessant and active work."

James H. Hustis was born in New York City on January 11, 1864. He was educated in the public schools. In July, 1878, he entered railway service as an office boy in the general superintendent's office of the New York Central & Hudson River at New York City, and up to May 20, 1891, held various positions in the general offices of that road. On May 20, 1891, he was appointed trainmaster and assistant superintendent of the Harlem division; from November 1, 1900, to August, 1902, he was superintendent of the River division; from August, 1902, to October 1, 1906, superintendent of the Rome, Watertown & Ogdensburg division; from October 1, 1906, to April 1, 1907, superintendent Hudson, Putnam and electric divisions; from April 1, to October 1, 1907, general superintendent western district. On October 1, 1907, he became assistant general manager on the Boston & Albany, which position he held until June 5, 1911, when he was appointed vice-president of that road. On September 1, 1913, he became vice-president of the New York, New Haven & Hartford, and on October of the same year became president of the road, which position he held until July, 1914.

On August 15, 1914, he became president of the Boston & Maine and held that position until August 29, 1916, at which time the railroad went into receivership and Mr. Hustis became temporary receiver of the road, and from June 19, 1918, to June, 1919, he also served as district director of the Eastern Region, United States Railroad Administration. On December 1, 1919, he was appointed chairman of the board of the Boston & Maine, and from December 19, 1919, to date has been president of that road.

Preliminary Report on Pere Marquette Train Control

WASHINGTON, D. C.

E. H. DeGROOT, JR., director of the Bureau of Signals and Train Control of the Interstate Commerce Commission, has written a letter to Frank H. Alfred, president, Pere Marquette, regarding the preliminary inspection of the installation of the intermittent induction auto-manual train stop device of the General Railway Signal Company on the 23.57-mile principally single track section of the line between Grand Rapids and Clarksville, Mich. As a result of this inspection, the following criticisms and comments are offered:

1. The track inductors as located and fastened make displacement or removal unlikely, and it is, therefore, believed that the employment of detectors is not required on this installation.

2. The closing of the inductor winding results in a clear operation of the device; hence a cross in the wires leading to this winding would result in a false clear condition of the inductor. It is, therefore, vital that the installation and maintenance of the track inductor circuit shall be such as to protect the integrity of this circuit.

3. The track element circuit should be maintained free from grounds and crosses in order to guard against false clear operations. In this installation one side of the inductor circuit is connected to the signal line common, and, therefore, more or less subject to grounds. It is suggested that a more satisfactory situation might be secured by maintaining this inductor circuit separately.

4. The track inductors are located at the signals, and the stop operation for an occupied block is provided at the next signal in the rear of that at the entrance to such block. This requires an engineman to forestall at a caution signal in order to enter the caution block, and should this block be too long and an engineman not be alert while running therein the train could approach the stop signal at such speed as to overrun this signal.

5. The plans as furnished indicated that adequate braking distance might not have been provided for opposing moves between signals 177 and 170 at Alto. Our engineers were informed that this situation would be taken care of by rearranging the signal circuits so that signal 183 would repeat the indication of signal 177. We have since been orally informed by your representatives that this has been done.

6. The inductor located at signal No. 4 on the Saginaw branch at Elmdale interlocker is not braking distance from this signal. The switches and signals at this point are so arranged as to divert a Saginaw branch train to the passing track should main line signals be cleared for an eastward or westward main track movement.

7. In some instances no inductors are provided on sidings or at head blocks to cause an automatic brake application should an eastward train for any reason attempt to move from a "westward" siding, or visa versa, to the main track while the block is occupied. This refers not only to "station" switches, so called, but also to switches such as those at stations 6833 + 96 and 7013 + 51, from which points eastward movements may be made and no inductor in stop condition be passed until the train has proceeded approximately six thousand feet. It is believed that an unwound inductor should be placed (1) at each switch where the distance to the next signal in advance is 2,500 feet, or more, with the view unobstructed, and (2) in those cases where the distance is less than 2,500 feet, if the view is obstructed.

8. It is suggested that the type of protection employed to guard against an open switch, and also the type of fouling protection employed, be considered with a view of possibly securing increased protection.

9. Since certain possible crosses in the locomotive wiring could result in false clear operations, it is obvious that the integrity of these circuits must be protected adequately at all times.

Forecasting Railway Revenues

Describing methods worked out by the New Haven to assist in budgeting of expenses

By J. E. Slater

Assistant to General Manager, New York, New Haven & Hartford*

THE problem of forecasting revenues is definitely connected with that of controlling operating expenses through a budget. Certain expenses, notably transportation expenses, fluctuate more or less directly with the volume of traffic handled. These expenses, however, can be controlled through a fluctuating budget as described by the present writer in an article in the *Railway Age* of November 1, 1924.

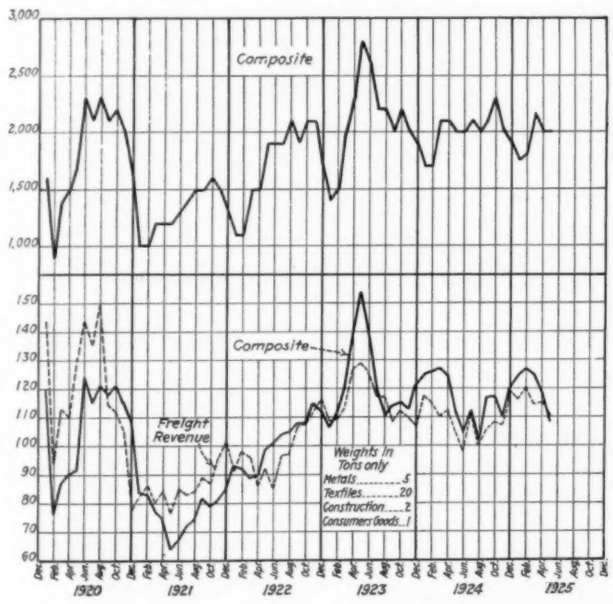


Fig. 1—Composite Index of Revenue Tons of Selected Groups of Commodities Compared with Freight Revenues

The problem of forecasting revenues does not apply to such expenses because it makes little difference whether the revenue forecast is 2 per cent or 5 per cent in error. The budget of transportation expenses, in the form described in the previous article referred to, will be automatically adjusted to the proper extent to take this error into account. Maintenance expenses, however, both of way and equipment, present an entirely different problem. Both of these should be handled on a fixed budget principle. This is due not only to the fact that these expenses are little, if any, affected by fluctuations in traffic, but also to the fact that the departments can be much more efficiently operated, and the amount of money allotted more economically spent, if the work can be laid out well in advance. The great trouble has been in the past that the budget has been fixed in the fall for the succeeding year and that the revenues upon which these budgets are based have not been forecasted accurately, with the result that violent fluctuations have taken place midway during the year. If the early months of the year show a sharp falling off in traffic, shops are closed down, repair work stopped, orders are cancelled, or like means taken to curtail expenses. On the other hand, if there is a business boom, there is likely to be a rush of new work started and carried through to a completion much less efficiently than desirable. Every maintenance and mechanical man knows with how much better facility he may handle his work if he is assured of a certain sum of money at the beginning of the year which he can spend at the time when it will do the most good. Otherwise, he is likely to concentrate all of the work and expense possible in the periods when there is no arbitrary ruling to keep his expenses down. Maintenance expenses should be controlled to a considerable extent with an eye upon the amount of money available for such expenditure, but this should be on the basis of an annual rather than a month to month control.

The Importance of an Accurate Forecast

This brings up as a most important consideration the importance of an accurate forecast of operating revenues. When in the late fall estimates are being made of the anticipated need in the following year of ties, new rail, track material, bridge and building renewals on the one hand,

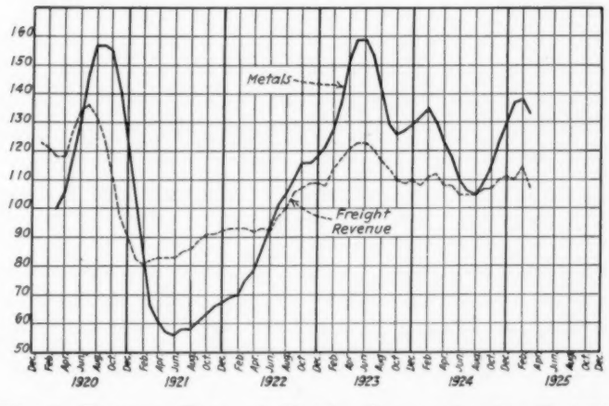


Fig. 2—Revenue Tons of Metals Compared with Freight Revenue

and in the classified repairs to locomotives and cars on the other, there should be available a reasonably accurate forecast of the operating revenues by months for the following year. When the maintenance of way and the maintenance of equipment budget is presented, it will be possible to determine how much, in addition to the requirements of safety, can be spent for the maintenance of way and equipment. It is well known that there is a wide margin between that which must be spent from a standpoint of safety and that which can be spent from a standpoint of good maintenance. As a rule, there is some attempt made to reach a figure which, while providing everything necessary for safe operation and as much as possible toward first-class maintenance will also reach a certain ratio of operating revenue. Economical operation requires that

*Mr. Slater has since become professor of transportation at the University of Illinois.

some such relationship should prevail. If that is the case it is obvious that the forecasting of revenues upon which this ratio is applied should be based not upon guess work, but upon some scientific method of arriving at the result.

Railroads Should Take Part

The present article does not attempt to show a clear way of providing that forecast. It is but an indication of the method which it is believed in the end will provide an accurate method of forecasting. The subject of predicting business conditions by other methods than good judgment is comparatively new in applied economics and much is to be learned by all who are studying the situation. Because of the great importance of having such a forecast, it is believed that the railroads should take an active part in these studies, and this article is written in the hope that interest and research on the subject may be somewhat stimulated.

The most serious difficulty in forecasting railroad revenues lies in the fact that they are affected by so many items. In the first place, there is the sub-division of the operating revenues into freight, passenger, mail, express, other transportation revenues and incidental revenues. In the second place, passenger and freight revenues in themselves should be sub-divided. On most roads the revenues other than passenger and freight are not sufficiently large to justify any special treatment or analysis.

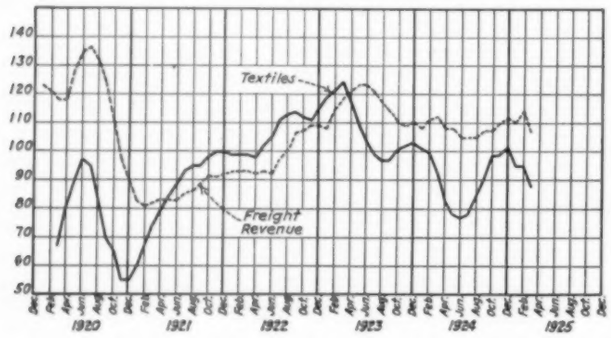


Fig. 3—Revenue Tons of Textiles Compared with Freight Revenue

The principal exception to this is express revenue, but here the difficulties of analysis are especially great and will probably not be productive of any great benefit.

The analysis of passenger revenue calls for its own peculiar consideration. It is generally considered that passenger revenue tends to follow the business activity—at prosperous times there are greater revenues and at slack times poor revenues. There are substantial reasons for this opinion. On the other hand, further study will indicate that general business activity affects primarily but one class of passenger traffic, while it may have little or no effect upon another. In and about large cities, such as New York, the commutation traffic may increase by leaps and bounds from year to year without regard to the general business situation.

When we turn to freight revenue we find a still different problem. The trend of freight traffic on the New Haven does not follow, except in the broadest outlines, the trends of traffic of business activity. While it does show peaks in the year 1920 and 1923 and a valley in 1921, it does not show a corresponding depression in 1924 during which year a business depression existed. This is due to the fact that railroad freight traffic is made up of several factors which are affected in an entirely different manner by the business cycle. To forecast freight revenues accurately, separate consideration must be given to each of these factors.

Key or Controlling Factors

The first problem, therefore, is to determine what are the key or controlling factors in a railroad's freight traffic. In other words, what are the items of freight traffic which reflect most accurately the trend in freight revenue. On the New Haven long studies were necessary to determine

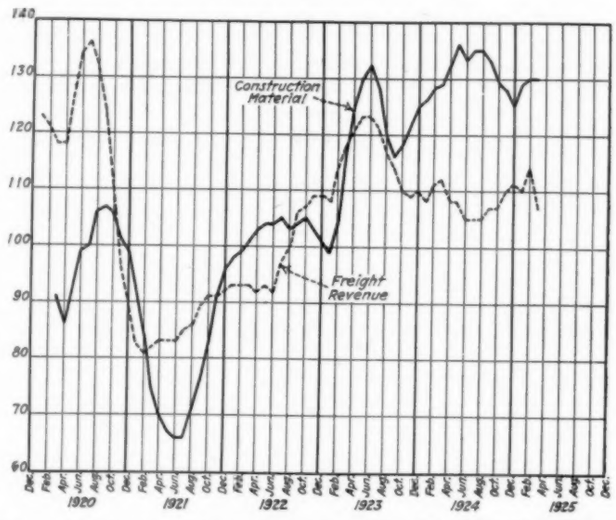


Fig. 4—Revenue Tons of Construction Material Compared with Freight Revenue

the key factors on this road. The territory is, of course, a manufacturing territory and might be thought to be peculiarly susceptible to manufacturing activity. After a long study, it was found that there were four groups

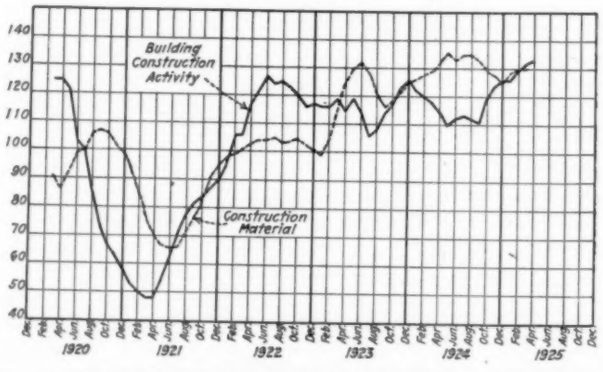


Fig. 5—Index of Building Construction Activity in Massachusetts, Rhode Island and Connecticut Compared with Revenue Tons of Construction Material on the New Haven

of items which, when combined, appeared to be the controlling factors. These groups were:

1. Construction material.
2. Textiles.
3. Metals.
4. Goods for current consumption in New England.

These items are not listed in the order of their importance since they are all necessary factors in the situation. The current data for these factors were found in the classification of tonnage as compiled from month to month and included in the annual report to the Interstate

Commerce Commission. The tonnage included in the various items was as follows:

Construction Material. Clay, gravel, sand and stone, asphalt, lumber, cement, brick and artificial stone, lime and plaster, sewer pipe and drain tile.

Textiles. Cotton, wool and textiles.

Metals. Iron, pig and bloom, bar and sheet iron, structural iron and pipe, other metals, pig, bar and sheet, castings, machinery and boilers.

Goods for Current Consumption in New England. All foodstuffs for human consumption, food for animal consumption and such manufactured articles as furniture,

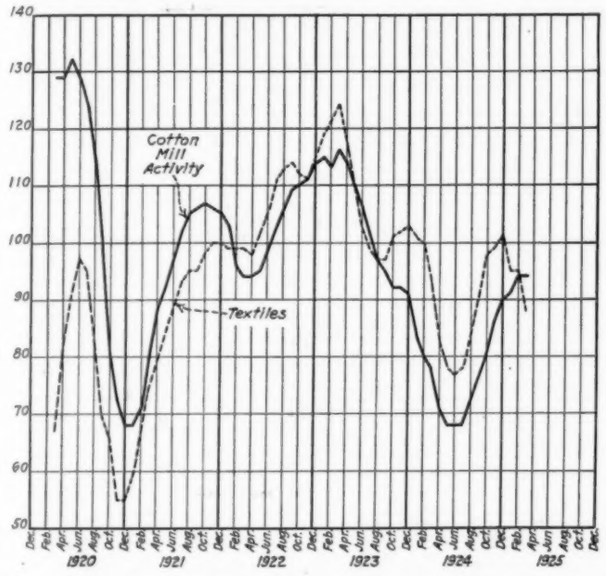


Fig. 6—Index of Cotton Mill Activity in Southern New England Compared with Revenue Tons of Textiles on the New Haven

automobiles, etc. Automobiles were included in the latter group rather than in the manufacturing group since there is but little automobile manufacturing in the New England territory and the movement of the cars is primarily for sales purposes.

Coal Excluded

It will be noted that these groups exclude entirely such important tonnage factors as anthracite and bituminous coal. While these are important in the total tonnage, it was found that they are not controlling factors in the New Haven situation in reflecting the rise and fall of freight revenues. The classification above also does not include other manufacturing activity such as the boot and shoe industry, paper industry, etc. That these four groups are, however, the key factors in the situation as far as the New Haven is concerned, is indicated in Fig. 1 on which is shown the freight revenues of the New Haven corrected for seasonal variations and expressed as a relative. Compared with a weighted average of the four groups, it will be noted that while the correlation is not 100 per cent it is remarkably close considering the fact that the tonnage commodities include such a relatively small portion of the total tonnage handled.

This problem of determining the controlling factors in the freight revenue situation in each road is the first to be solved. Obviously, on some roads one single item such as coal will be the key factor, while it is possible that on others the movement of crops will be controlling. The New Haven is an interesting example of the importance of determining these factors since there it is a combination of several rather than a single one. The latter is best indicated in Fig. 2 showing the trend in metals compared with freight revenue. This chart is based upon a five months' moving average for both revenues and tonnage of metals corrected for seasonal variation. It will be noted that while there is a distinct relationship during much of the period between the movement of metals and the freight revenue, there is a decided variation in the middle of the year 1924. The freight revenues did not reflect the depression of that year in the same manner as did the movement of the raw and finished products of the metal industries. Fig. 3, showing the same situation for textiles, illustrates the same point. The solution of this lack of correlation in that period lies in Fig. 4 which shows the movement of construction material. It will be noted that in 1924 when the manufacturing activity was at low ebb, building activity was on a very high plane. As a result, the freight revenues did not reflect the depression in the manufacturing activity. This illustrates in a graphic way the necessity of determining all of the controlling factors and of analyzing the situation for each of them separately.

Available Statistics

At the present time there is a vast amount of information available covering activity in various lines of industry and trade. These data may be used as a basis of analyzing the situation in the particular groups of industries which are the controlling factors on a railroad. With comparatively little, if any, expense and with comparatively a small amount of work, the railroad officers can be kept

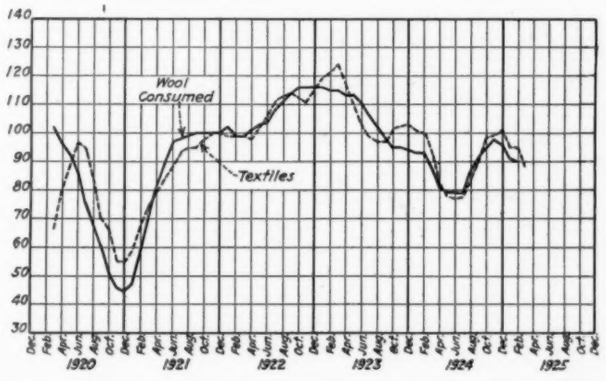


Fig. 7—Index of Wool Consumption in United States Compared with Revenue Tons of Textiles on the New Haven

currently and accurately informed as to the conditions in these industries in the particular territory covered by their railroad. While most railroads have information of one kind or another covering the situation in their territory, a distinct disadvantage of this information lies in the fact that it is scattered, based upon a compilation of the opinions of many men and frequently is contradictory. It has not been and can not be definitely reduced to a concise fact except in the minds of the person reading the information. Even then the impression received may not be accurate. With the statistics which are made available by the Department of Commerce, by the Federal Reserve Board and by various other public or semi-public organizations, it is not difficult to develop accurate and comprehensive statistical data for the particular territory involved. The character of the information derived by the New Haven in the study of its problem is given as an example.

There is a considerable amount of information available

on the building activity which provides a reasonably accurate forecast of the business which is to be handled. This may be derived from the permits issued in the various cities and towns along the lines of the railroad, or from the Dodge or Straus reports. The data for permits granted is expressed in dollars and, therefore, is subject to change on account of price changes. The New Haven uses the Dodge reports of contracts awarded as expressed in square feet of floor area, this making it unnecessary to apply correction for price or wage changes. This information covering all construction projects, residential, industrial, commercial and public for the states of Massachusetts, Rhode Island and Connecticut on the basis of a five months' moving average corrected for seasonal variation and compared with a like figure for the tonnage of construction material on the New Haven is shown in Fig. 5.

It will be noted that the information as to contracts awarded distinctly forecasts all the major changes in the movement of material and indicates the close relationship between the building industry and the building materials handled on the railroad in this territory. If information forecasting the situation as accurately were available for all of the factors in the freight traffic, the problem of forecasting would be much simpler.

Textiles

One of the chief differences with reference to information as to textiles is due to the fact that l.c.l. freight is not classified by commodities, but is a class in itself. Textiles in the shape of piece goods are made up to a large extent

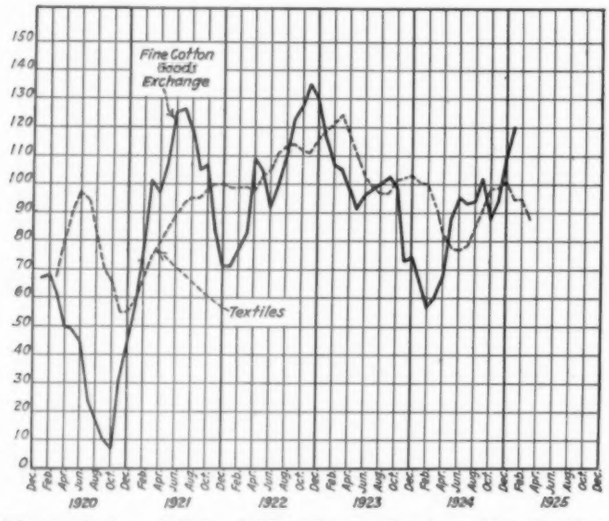


Fig. 8—Index of Sale of Fine Cotton Goods at New Bedford Compared with Revenue Tons of Textiles on the New Haven

in l.c.l. shipments and the car load shipments, therefore, represent but a small portion of the total. In view of this fact, it is interesting to note how close is the trend in the movement of car load shipments of textiles with the cotton and woolen mill activity as expressed by the wool and cotton consumed. There are shown two charts —Fig. 6 comparing the movement of textiles on the New Haven with cotton and Fig. 7 with wool consumption. Both charts are based on five months' moving averages corrected for seasonal variation.

It will be noted that the manufacturing activity is coincident with the movement of the finished product. There is in no way a forecasting of the railroad shipments in the activity at the mills. Nor has there been shown to be as close relationship as would be expected in the movement of the raw cotton and wool into New England with the movement of the finished product out. As would be expected, the information covering orders comes the closest to being a forecaster of manufacturing activity and the movement of the manufactured goods.

In connection with the textile industry, there is one statistical item which appears to forecast the movement in the textile industry with a considerable amount of accuracy. This is the data covering the sale of fine cotton goods at New Bedford.

Fig. 8 is a chart representing a five months' moving average corrected for seasonal variation, compared with the movement of textiles.

It will be noted that the orders for cotton goods precede

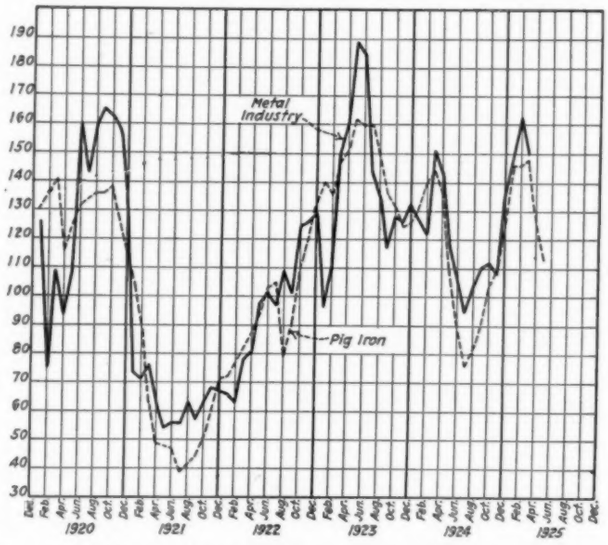


Fig. 9—Production of Pig Iron in United States Compared with Movement of Metal Products on the New Haven

the movement of textiles in almost every major movement by several months. While the percentage of correlation is not as high as in some of the other charts, it is remarkable in view of the narrow range covered by the forecasting as compared with the total movement of textiles in car loads on the railroad.

Metals

The metal industry is one of the most important on the New Haven Road, especially in Connecticut, and some sections of Rhode Island and Massachusetts. Unfortunately for the New Haven's forecasting problem, there is less information on the metal industry (outside of the steel industry) than in many of the other lines of industrial activity. This applies especially to the non-ferrous industries which are particularly important in Bridgeport and the Naugatuck Valley. It has been found that some available statistics as to employment do rather accurately reflect the general movement of commodities on the railroad, but the trend of the employment forecasts the movement of the tonnage on the railroad only to the extent of a month or two.

As far as the New Haven's own problem is concerned, this is one of the most difficult features. It is of interest, however, to note the close similarity between the production of pig iron for the United States as a whole and the movement of metal products on the New Haven rails. The degree of correlation between the two is remarkably close in view of the difference in the two items and the variation in the factors affecting each.

There is given in Fig. 9 a chart comparing the production of pig iron in the United States with the movement of metal products on the New Haven. This is not based upon the moving average, but represents the actual figures corrected in accordance with the Person's method.

There is one feature with respect to the metal industry, however, which makes possible some forecasting of the movements of these products. This is the fact that the activity in the metal industry appears to lag somewhat behind the activity in other industries, especially the textile industry. The situation in the textile industry, therefore,

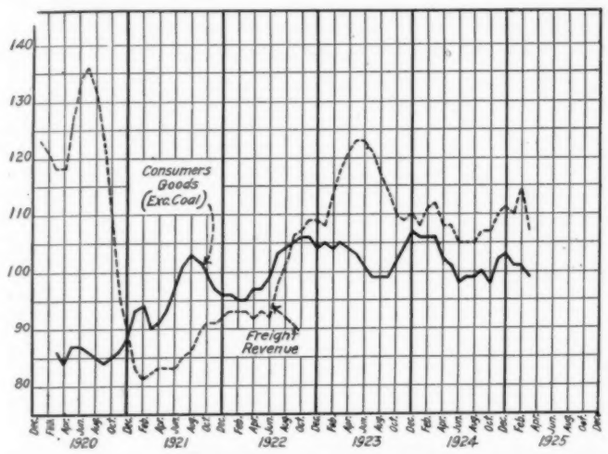


Fig. 10.—Movement of Consumers' Goods (Excluding Anthracite Coal) on the New Haven Compared with Freight Revenue

helps in some degree in forecasting for a short period ahead the gneral trend in the metal industry.

Goods for Consumption in New England

As previously indicated, this group contains mostly foodstuffs for human and animal consumption. It tends to be relatively stationary. It is, of course, subject to seasonal variation and to some extent appears to be controlled by the business cycle. To the extent that this is true, it is doubtless due to the fluctuations in the amount and the value of the buyers' demands.

In Fig. 10 is given a five months' moving average of the movement of consumers goods and the freight revenue, which clearly indicates the relatively slight fluctuations in the movement of goods for consumption as compared with the revenue from all tonnage.

It will be noted that except in one period the fluctuations do not tend to be more than 10 per cent either side of normal, while reference to the charts showing activity in various industries shows much greater fluctuations than this. As far as the New Haven is concerned, it is the movement of this great mass of food products and other articles for consumption which prevents the railroad earnings in New England territory from showing the wide fluctuations that appear in industrial and general business activity. These products represent a leveler which reduces the peaks in the traffic and builds up the valleys. This, of course, does not refer to seasonal changes because the movement of these products is susceptible to seasonal variation. They are not, however, particularly susceptible to the general business cycle as is the case with the other lines of activity.

Methods of Compiling and Charting Information

This article is not written as a contribution to the general science of forecasting business, but rather to indicate the adaptability of such methods to the forecasting of railroad revenues. The methods which have been used on the New Haven are not new and undoubtedly further research on the New Haven or on other roads will develop better methods of correcting the fluctuation of business for season and trend. One great difficulty with the data available to the railroads for forecasting purposes is that the statistics are not available over long periods of time. While revenue ton-miles are available for many years back, the analysis of the business into its component elements is possible only through the analysis of the tonnage information or like data. This is available in the present form only since 1920. It is generally recognized that a five-year period is not sufficiently long to permit accurate correction for seasonal variations and for trend. Furthermore, the tonnage moving on railroads is susceptible to other fluctuations than that of business, these fluctuations being due to the slowing up of the movement due to weather conditions, strikes, or congestion due to other causes. Due to the short period available and to other fluctuations mentioned, the use of the Person's method used by the Harvard Economic Service does not in many cases produce satisfactory results. It has been found that a five months' moving average corrected provides more satisfactory results, and it is probably true that a three months' moving average would likewise show an improvement. The objection to a five months' moving average lies in the fact that the chart can not be brought up-to-date except on an approximate basis and on this account the New Haven applies the correction for season both by the Person's method and by the five months' moving average corrected.

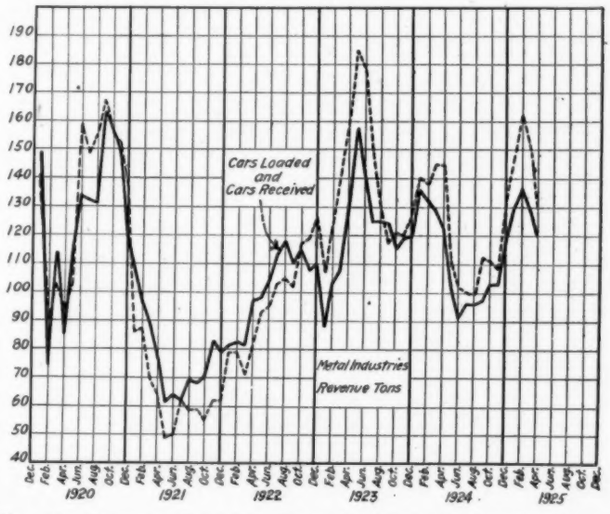


Fig. 11—Revenue Tonnage Data for Metal Industries Compared with Car Loads of Iron, Steel and Copper

There is one further difficulty with the use of the tonnage data. The classification of tonnage is one of the last statistics to be available, and in many cases it is not available until 45 days after the close of the month. In forecasting it is vitally important that the data be as up-to-date as possible. On this account it has been found that car loading information if segregated into few commodities can be used effectively. The New Haven has a daily car loading statement the monthly totals of which are available four or five days after the close of the month. On this statement there is sufficient detail to provide up-to-date data on the movement of cotton and wool building materials and raw metal products. As an example, there is given in Fig. 11 a chart comparing the tonnage data

for the metal industries with the car loads of iron, steel and copper moved. In view of the fact that the car loadings include only movement of raw products, while the tonnage data includes the movement of both raw and finished products, the correlation between the two is very significant. Furthermore, it permits the extension of the tonnage data on an approximate basis soon after the close of the month and makes the information in every way up-to-date. It is not believed that total car loadings data would be of much value since there are included all commodities and since the same weight is given to l.c.l. loadings as to car load freight.

Judgment Necessary

There is no pretense that the methods above outlined provide a complete and accurate method of forecasting revenues for a year in advance. Much remains to be done in working out the New Haven's problem, but sufficient progress has been made to indicate clearly the possibilities in this direction. It is probable that an accurate statistical forecaster is a will-o'-the-wisp which will not be found. On the other hand, in some industries there are factors which appear to forecast with reasonable accuracy the situation in that particular industry some months hence. As an example, the contracts awarded act as a forecast in the building industry and the sale of cotton goods at New Bedford forecasts the situation in the New England textile industry. Fundamentally, however, forecasting will not be reduced to a mathematical science, but must be based, to a large extent, upon accurate knowledge of the condition of the industry, the money market, the foreign trade situation and the like. Judgment based upon such knowledge, however, will be aided to an enormous extent by study of the trend and statistical analysis of the industry along the lines above outlined.

The railroads would do well to contribute their share in the study of this problem which is as important to them as it is to the various progressive companies that have already progressed far in this field.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading for the 52 weeks ended December 26 amounted to the record-breaking figure of 51,177,962 cars, an increase of 5.4 per cent as compared with the 1924 loading and of 2.7 per cent as compared with that of 1923. As compared with 1920 the increase was 13.4 per cent. The total for 1925 also exceeded by 683,392 cars, or 1.4 per cent, the estimate made early in the Spring by the Car Service Division of the American Railway Association. For the week ended December 26, which included the Christmas holiday, the total was 701,079 cars as compared with 647,324 in the corresponding week of 1924 and 615,419 cars in 1923. For the week ended December 19 the total was 967,886 cars, as compared with 900,645 in 1924 and 877,627 in 1923. The summaries, as compiled by the Car Service Division, for the last two weeks of the year appear in the next column.

The freight car surplus for the week ended December 14 averaged 172,577 cars, an increase of 12,680 cars as compared with the preceding week. For the week ended December 22 the average surplus was 186,285 cars, including 63,509 coal cars and 83,830 box cars. The Canadian roads for the same week had a surplus of 9,630 cars, including 6,430 box cars.

Week Ended December 26, 1925

Districts	1925	1924	1923
Eastern	162,528	153,346	154,281
Allegheny	148,054	153,346	154,281
Pocahontas	31,429	23,389	21,902
Southern	105,718	98,300	82,856
Northwestern	80,579	78,157	75,899
Central Western	116,227	108,015	101,587
Southwestern	56,544	49,269	44,429
Total Western	253,350	235,441	221,915
Commodities			
Grain and Grain Products	33,267	33,462	31,946
Livestock	22,729	25,228	24,939
Coal	122,350	129,725	112,414
Coke	14,832	11,418	10,311
Forest Products	45,798	40,309	36,347
Ore	10,432	6,879	8,183
Mdse., l. c. l.	200,372	190,869	183,045
Miscellaneous	251,299	209,434	208,234
Total	701,079	647,324	615,419

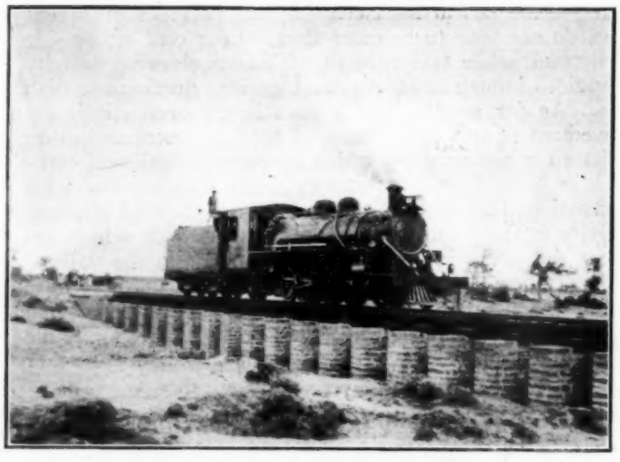
Week Ended December 19, 1925

Districts	1925	1924	1923
Eastern	214,820	207,992	214,964
Allegheny	196,023	184,256	185,340
Pocahontas	56,591	47,810	39,878
Southern	157,773	152,421	130,086
Northwestern	114,503	101,913	111,194
Central Western	154,258	137,489	136,086
Southwestern	73,918	68,773	60,079
Total Western	342,679	308,175	307,359
Commodities			
Grain and Grain Products	54,159	47,183	47,439
Livestock	34,396	36,226	34,988
Coal	187,398	190,847	183,376
Coke	16,503	11,872	11,394
Forest Products	69,467	67,514	67,193
Ore	11,625	10,175	10,792
Mdse., l. c. l.	252,660	239,589	234,219
Miscellaneous	341,678	297,348	288,226
Total	967,886	900,654	877,627
December 12	1,008,824	957,424	899,757
December 5	1,020,873	969,485	913,921
November 28	923,213	879,131	835,081
Cumulative Total 52 Weeks	51,177,962	48,534,433	49,812,113

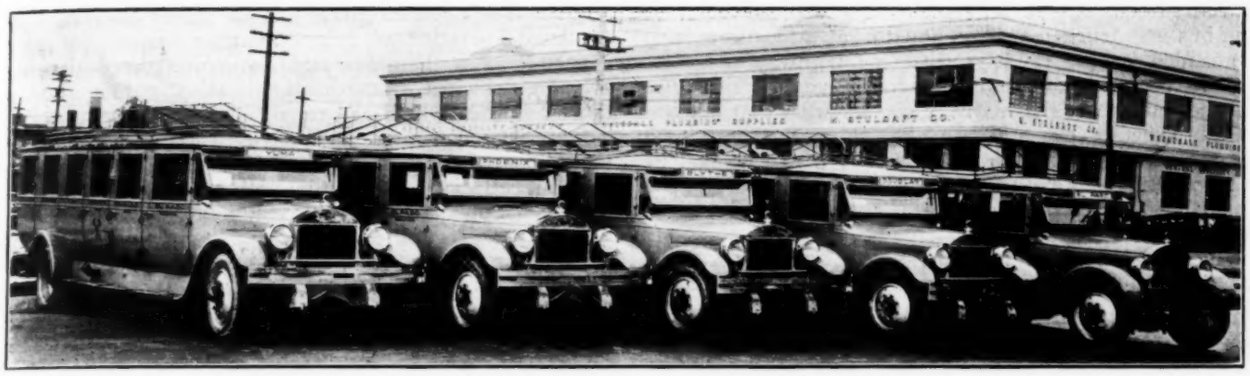
Car Loading in Canada

Revenue car loadings at stations in Canada for the week ended December 19 totalled 64,771 cars, a decline from the previous week of 4,678 cars. Grain loadings, with the close of navigation, were lighter by 3,795 cars, live stock showed a drop of 638 cars and coal a decrease of 821 cars, while the other commodities showed gains.

	Total for Canada			Cumulative Totals to Date	
Commodities	Dec. 19, 1925	Dec. 12, 1925	Dec. 20, 1924	1925	1924
Grain and grain products	16,454	20,249	5,959	497,291	479,452
Live stock	2,337	2,975	2,263	126,175	124,128
Coal	6,839	7,660	6,033	237,228	284,725
Coke	428	469	294	15,971	12,270
Lumber	3,128	2,867	2,822	179,221	181,839
Pulp wood	2,115	1,641	1,912	125,720	122,677
Pulp and paper	2,242	2,302	2,073	105,419	100,485
Other forest products	2,512	2,703	2,122	142,844	129,007
Ore	1,409	1,319	1,010	72,550	63,864
Merchandise, L. C. L.	15,578	15,835	13,675	781,307	744,784
Miscellaneous	11,729	11,429	8,752	659,765	618,333
Total cars loaded	64,771	69,449	46,915	2,943,491	2,861,564
Total cars received from connections	34,973	34,320	31,288	1,697,920	1,604,980



American Built Locomotive on Jodhpur Railway, India

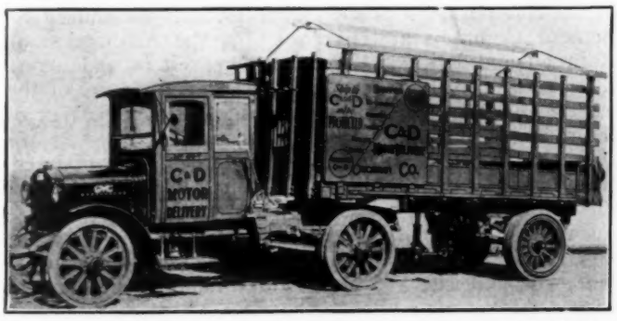


These Buses Operate in Arizona Under a Comprehensive System of Regulation and Taxation

Early Adoption of Bus and Truck Regulation Indicated

Movement for adequate regulatory and tax laws points to end of unrestricted competition

THE regulation of motor buses and trucks engaged as common carriers in interstate commerce, and a more extensive and consistent policy of regulation and taxation within the states appears imminent. The railway and utilities commissioners of the states, representatives of steam and electric railways, the motor manufacturers' associations and the larger operators themselves are in agreement that adequate regulation and taxation of bus and truck operations will stabilize rather than destroy the industry. The whole subject of regulation and taxation of motor vehicles is of great interest to railway officers since several roads are already using them and others are about to adopt them. Furthermore, regulation and taxation will affect profoundly their highway competitors.



Highway Carriers in Interstate Service Are Now Subject to Regulation in 38 States

Two theories are being dissipated. One is that an equitable system of regulation and taxation of buses and trucks carrying on transportation on the highways will eliminate them. The other is that the steam railways, in order to prevent the termination of their own existence, must strive for such destruction. In the place of these the belief is spreading that the adoption of fair regulation and taxation will have an effect desired both by the railways and by the bus and truck operators and manufacturers. Furthermore, it will have an effect desired by the public. This will be the elimination of bus and truck operations where their existence is not justified, the strengthening of bus and truck operators whose service is economically needed, and indication of the lines along which railway transportation and highway transportation can be co-ordinated to the benefit of each and of the public.

Proposed Principles of Regulation and Taxation

While there are many plans of regulation and taxation of motor buses and trucks which vary in details, they are nevertheless in agreement as to certain basic principles to be used in the formation of the soundest and most equitable laws. It is generally agreed that the control over transportation of passengers or freight on regular routes or between fixed points should be exclusively in the hands of some agency of the state, rather than local agencies, in the case of intrastate transportation, or in the hands of the Interstate Commerce Commission in the case of interstate transportation. An apparent majority, in this connection, favor the administration of the regulation of interstate highway carriers by the Interstate Commerce Commission through the medium of the state commission.

The second principle upon which there has been agreement is that as a prerequisite to the operation of a bus or truck as a common carrier, the owner should be obliged to secure a certificate of public convenience and necessity from the regulatory commissions having jurisdiction, and that provision should be made for liability insurance adequate to indemnify injury to persons or damage to property while in transit. State regulatory bodies should also, it is believed, in general have the powers controlling the motor vehicle common carriers that they exercise in controlling other forms of public utilities.

There is wide disagreement as to the purpose and amount of taxation of motor vehicle common carriers. In fact, it is a point upon which almost no two interests

are in agreement. It is generally conceded, however, by the bus and truck operators and the manufacturers, and demanded by the railways, that the highway operators should be taxed an amount proportionate to their use of and damage to the highways. Just what that amount is and whether bus and truck operators now pay such an amount, is a question on which much will be said by all concerned. One thing that is known, however, is that almost no two states are in agreement at this time as to the amount they tax motor bus and truck operators in their states. This situation is receiving the close attention of a large number of the members of state boards of railway and utilities commissioners.

Demand for Regulation Spreads

The past year has seen a spread of a demand on the part of the public for regulation of the highway carriers. This has taken various forms. Many communities, through chambers of commerce, or other civic organizations, have intervened in hearings before state commissions to oppose applications of bus and truck operators for certificates of public convenience and necessity, recognizing the essential nature of railway transportation and urging that the continued existence of railway service not be endangered through the admission of unnecessary competitors. Organizations of railway employees have also, on numerous occasions, appeared before state commissions opposing the granting of such certificates. For example, the railway labor organizations in Colorado recently united and threw the influence of their combined memberships into the contest between the railways and the bus and truck operators. The effect of such efforts, while not always successful, has nevertheless impressed upon the commissions the necessity of requiring evidence from the would-be bus or truck operators that their service will be a necessity as well as a convenience.

Another strong demand for regulation of the highway carriers has come from the various organizations of industrial traffic officers headed by the Associated Traffic Clubs of America. The Associated Traffic Clubs of America at their convention this year adopted a resolution advocating the passage by Congress of a law charging the Interstate Commerce Commission with regulation of motor vehicles engaged in interstate commerce, and proposing that such regulations be in harmony with the regulations now applying to the steam railways. This action of the convention was subsequently ratified by the traffic clubs in various cities.

"Motor transportation companies are engaged in the same sort of commerce as the railroads," said E. F. Buckmaster, assistant general agent of the American Railway Express Company, and president of the Chicago Traffic Club, at the special meeting of that club which ratified the resolution of the national convention. "Federal regulation should fix the extent of the responsibility of highway carriers. One of the most important angles of this question is that there should be a law defining the actual liability of motor companies as a protection for goods and passengers against collisions and other damage."

Reasonable regulation of motor vehicles is also recommended by the National Automobile Chamber of Commerce on behalf of the motor manufacturers. At the Mid-West Transportation Conference of representatives of the railroads, the motor interests and the public, which was held in Chicago in June, 1925, upon the call of the National Automobile Chamber of Commerce, a resolution was passed approving adequate regulation of the motor carriers. This resolution read in part: "The test of experience has demonstrated the wisdom of reasonable regulation of common carriers in the public interest. Unregulated operation of common carrier motors can only adversely affect the public right to uninterrupted, dependable and efficient transportation. It is unfair also to those agencies which are regulated and to the existing motor carrier operators themselves whose service to the public cannot be best maintained if it is subjected to constant attacks from 'fly-by-night' and financially irresponsible operators." The resolution also recommended that the state regulatory bodies be given the same control over motor vehicle common carriers that they have over the other public utilities and that Congress should enact a law to regulate interstate highway commerce.

Congress to Consider Many Bills

In response to this widespread demand for regulation of buses and trucks engaged in interstate commerce, a bill, a forerunner of a number of others, has already been introduced in the current session of Congress providing for such regulation. This bill, which was noted in the *Railway Age* of December 19, was introduced by Senator Cummins at the request of the Association of Railroad and Utilities Commissioners. It is understood that it has also the tentative and general approval of the American Automobile Association, of representatives of the railways, and others.

Interstate Truck Operators Are Free from Regulation

In brief, this bill provides for the regulation of interstate highway carriers by the Interstate Commerce Commission through the medium of the state commissions, acting individually or jointly. Requirement is made that bus and truck operators must secure certificates of convenience and necessity and file bonds to insure their financial responsibility; must publish the rates which they propose to charge, these being subject to change on order of the commission; and reasonably strict adherence to schedules proposed is required.

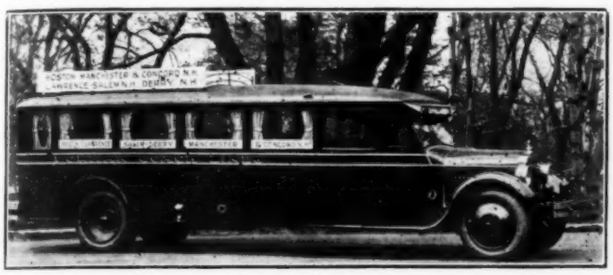
Other bills with similar requirements but with changes in certain details, are known to be in preparation for early presentation to Congress. It is generally expected that the present Congress will take action upon some of them, at least. In the last session of Congress such a regulatory bill was introduced but was not reported out of the interstate commerce committees so that it was not voted upon by the houses of Congress. Since that time, however, the sentiment in favor of bus and truck regulation has spread so rapidly that the expectation is that this Congress will not fail to act in the matter.

State Regulation Also Growing

On January 1, 1925, only 31 of the 48 states had laws regulating the operation of buses and trucks as common carriers on their highways. This was pointed out in the *Railway Age* of December 5 in the article on the bus and

truck situation. The year 1925, however, saw a number of changes. According to Russell Huffman, secretary of the Motor Vehicle Conference Committee of New York, seven more states have this year passed laws placing highway carriers under state regulation. These states are Idaho, Indiana, Kansas, Massachusetts, Minnesota, North Carolina and South Carolina. In addition to these, according to Mr. Huffman, five states have repealed their old regulatory laws and enacted new ones, 150 bills affecting bus operation having been introduced in 42 state legislatures.

These seven states, with the 31 states which had regu-



Interstate Buses Like This One Will Be Subject to Regulation if Pending Legislation Is Approved by Congress

latory laws at the beginning of the year, bring the total number of states regulating common carriers operating on the highways to 38, leaving 10 states without any such laws.

Tendency Toward Standardization

Since the states are perceptibly moving toward regulation of the highway carriers, railway officers consider the need at present to be the standardization of the existing state laws relating to bus and truck operation in common carrier service. The committee on motor bus operations of the Association of Passenger Traffic Officers described the situation, particularly relating to taxation, as follows: "There are almost as many plans of taxation and regulation for motor vehicles and vehicle common carriers as there are state taxing and regulatory bodies. In general, the plans of taxation remain chaotic, unscientific and unremunerative. As a rule, the taxes in all states are probably much lower than the cost of maintaining highways damaged by motor vehicle common carriers. Until this situation has been corrected, the public will be subsidizing the operation of these transportation units."

In general, it is considered that the states for the most part have gone only a short distance along the way of regulation and control of operations of common carrier trucks and buses. In some cases the regulation of licenses, weight and speed limitations has been provided for without further steps beyond the mere restrictive measures. The northeastern, the middle western and the four far western states have probably gone farther than the others in establishing a consistent form of regulation. The others have either established only partial regulation or no regulation at all. There has been no uniformity whatever.

A number of states are conscientiously working out programs for the passage of comprehensive motor transport regulatory laws. Many of them are feeling their way along and formulating principles as new conditions arise. Early returns from a survey being made of the regulation situation in the states indicate that the commissions empowered by law to regulate operations on the highways are assuming an open-minded attitude toward the problems that arise. They are working almost without exception toward the passage of uniform laws of comprehensive nature.

One of the leaders in this movement is the state of California. President Harley W. Brundige of the Railroad Commission of California called representatives of motor transportation interests, shippers and agricultural interests to a meeting in San Francisco on December 12 which voted in favor of the creation of a general committee of 21 representatives of all interests involved and an advisory board of 5 members to draft a comprehensive motor transportation act for presentation at the next session of the California legislature. More than 300 representatives of the various interests indicated attended this meeting. In calling the meeting to order, President Brundige stated that there was need for action toward drafting comprehensive and efficient legislation for the regulation of motor transportation, since due to the development of the business in California, it embraced many forms of carriers not originally included in the California motor truck stage act. The courts by their decisions have also held that other forms not included in the original act were subject to regulation by the commission. The advisory board approved by the meeting will be appointed by the railroad commission and will consist of one representative of the commission, one representative of the shipping interests, one representative of the franchise motor passenger carriers, one representative of the franchise motor freight carriers, and one representative of the independent non-certificated motor freight carriers.

Uniform State Regulatory Law Proposed

A uniform bill for motor vehicle regulation by the states has been proposed by the American Electric Railway Association. This has the support of that association and of the American Short Line Railroad Association. While it was described briefly in the *Railway Age* of December 5, it embodies so many interesting and constructive features that extensive excerpts from it are printed below. Its tax provisions are particularly noteworthy as represen-

The New York to Boston Buses, Operating Interstate, Are Not Subject to Regulation

tative of the contentions in this regard of the electric and steam railway interests. After the formal heading the bill reads in part:

"The railroad commission of the state of ———— is hereby vested with power and authority and it shall be their duty to supervise and regulate every motor carrier in this state; to fix or approve the maximum and minimum rates, fares, charges, classifications and rules and regulations pertaining thereto of each motor carrier; to regulate and supervise the accounts, schedules, service, safety of operation of each such motor carrier; to prescribe a uniform system and classification of accounts to be used, which among other things shall set up adequate depreciation charges, and after such accounting system shall have been promulgated motor carriers shall use no other; to require the filing of annual and other reports and any other data; and to supervise and regulate motor carriers and all other matters affecting the relationship between such common carriers and the traveling and shipping public. The railroad commission shall have power and authority by general order

or otherwise to prescribe rules and regulations applicable to any and all motor carriers. All control, power and authority over railroads and railroad companies now vested in the railroad commission is hereby specifically extended to include motor carriers.

"All charges made by any motor carrier for any service rendered shall be just and reasonable and every unjust and unreasonable charge for such service or any part thereof is prohibited and declared unlawful.

"It is hereby declared unlawful for any motor carrier to operate or furnish service within this state without first having obtained from the railroad commission a certificate declaring that public convenience and necessity require such operation. The railroad commission shall have power and it shall be their duty after public hearings to issue such certificates, or to refuse to issue the same, and may attach to the exercise of the rights granted by such certificates such terms and conditions as in its judgment, public convenience and necessity may require. The railroad commission may at any time suspend, alter or amend any certificate issued or after hearing for cause, may revoke any such certificate.

"In addition to the regular taxes imposed on motor vehicles in this state, every motor carrier shall pay the following taxes for the maintenance and upkeep of the public highways: motor vehicles having pneumatic tires, one cent per ton mile of travel over and along the public highways; motor vehicles having hard rubber or solid tires, one and one-half cents per ton mile of travel over and along the public highways. In figuring the ton miles of passenger travel, the maximum seating capacity of each passenger-carrying motor vehicle unit, trailers to be included, at 150 lb. per passenger seat plus the weight of the vehicle multiplied by the number of miles operated (all divided by 2,000) shall determine the ton miles of passenger travel per month. In figuring the ton miles of freight travel, the maximum freight-carrying capacity of each freight carrying truck or vehicle unit, trailers to be included, plus the weight of the vehicle multiplied by the number of miles operated (all divided by 2,000) shall determine the ton miles of freight travel per month.

"The motor carriers shall keep a daily record upon a form prescribed by the railroad commission, of all schedules maintained, motor vehicle and trailer units used, and motor vehicle and trailer units laid up for repair during the current month and on or before the 10th day of the month following shall certify under oath a summary of the daily record which shall show the grand total ton miles of travel, both passenger and freight, made by the motor carrier during the preceding month.

"Regularly each month the railroad commission shall certify to the various county treasurers in the counties through or in which any motor carrier is operating, the total amount of the special tax due from each motor carrier for operation over the public highways for the preceding month. This tax shall be computed by multiplying the total number of ton miles operated by each motor carrier as shown by their sworn monthly summary by the rate or rates of taxation as in this act specified. Thereupon the county treasurer shall enter the amount of the tax so certified upon the tax books of the company and serve a notice upon the motor carrier of the amount of tax due.

"The money received by the county treasurer from this source shall be allocated to the various city and county road districts in the proportion that the number of miles of public highway used by the taxed motor carrier in any one district bears to the total number of miles used within the county. Such funds shall be used by each governmental agency receiving the same for the maintenance and repair of the highways and streets over which the carrier operates.

"No certificate of convenience and necessity shall be issued by the railroad commission to any motor carrier until and after such motor carrier shall have filed a liability insurance bond.

"The railroad commission, in the exercise of the authority by this action invested in it to supervise and regulate all motor carriers, shall promulgate such safety rules and regulations as it may deem necessary.

"Every motor carrier unit and all parts thereof shall be maintained in a safe and sanitary condition at all times and shall be subject to the inspection of the commission.

"Every driver employed by a motor carrier shall be at least 21 years of age, have good moral character, shall be fully competent to operate the motor vehicle under his charge, and shall hold a regular chauffeur's license.

"On passenger-carrying motor carrier units passengers will not be allowed to ride on the running boards, fenders, or any other part of the outside of the vehicle.

"On freight-carrying motor carrier units no part of the load shall be allowed to project more than six inches beyond the running board of the vehicle, or measure more than eight feet wide over all.

"No passenger-carrying vehicle shall be driven over the public highways at a greater rate of speed than 25 miles per hour. No freight-carrying unit shall be driven at a greater speed than 20 miles an hour.

This comprehensive draft will be the center of future efforts to secure uniform regulation of buses and trucks within the states. The only provision over which there has been and will be any extended controversy, is the amount of the tax. The amounts of one cent a ton-mile for pneumatic tired vehicles and one and one-half cents a ton-mile for hard tired vehicles were arrived at by the committee of the American Electric Railway Association after extensive surveys. The committee admits that the information upon which the amount of the tax was based was incomplete, adding its opinion that any change which might appear necessary in the future would be in the form of a revision of the amount of the tax upwards, rather than downwards.

Sharp Division Over Taxation

Regulation of buses and trucks operating as common carriers has the united approval as a principle of virtually all interests. Taxation as a principle has similar approval, but the amount of a tax which would be fair and just is a point on which there is sharp controversy. There is general agreement that taxation should not be adopted for the purpose of strangling highway transportation. The conservative elements on both sides advocate a tax schedule which would impose a fair share of the cost of construction and maintenance of highways upon trucks and buses without unduly burdening them or restricting the development of this form of transportation. Heavy duty trucks and buses, however employed, make necessary road construction of a stronger character than would be required for traffic exclusively made up of light pleasure vehicles. This extra charge railway men and others declare should be paid by the owners of trucks and buses which require the expensive form of construction.

On the other hand, the Bureau of Public Roads of the Department of Agriculture has published the results of an investigation which are declared to justify the conclusion that the various taxes levied upon commercial motor vehicles are not unduly low and that they are in no sense subsidized to the disadvantage of any commercial carrier. This report points to special vehicle taxes, gasoline taxes and other forms of taxes levied in some states to prove that the bus and truck operator, who pays a larger vehicle tax and a larger amount through the gasoline tax than do the private car owners, is already taxed enough. Not all states have gasoline taxes, however, and the number of states in which the vehicle tax on buses and trucks is greatly in excess of that on privately owned vehicles, is limited. This very interesting report entitled, "Commercial Vehicles on Free Highways," by Thomas H. MacDonald, chief of the Bureau of Public Roads, was published in the September, 1925, issue of the Journal of Land and Public Utility Economics.

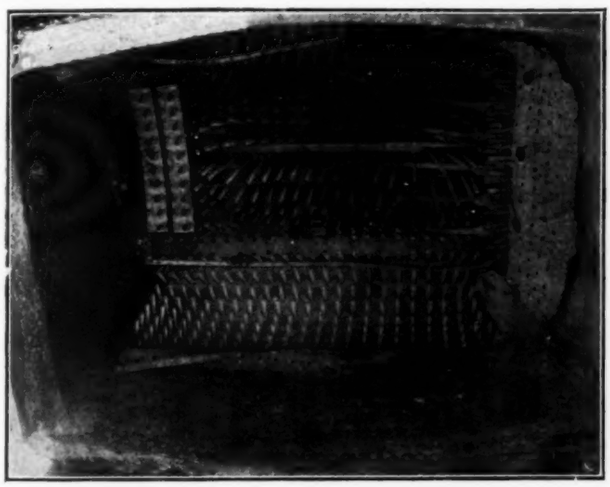
So many conflicting arguments make the tax question a puzzling one. It is a question of vital importance to the highway transportation industry, but there is no expectation that any form of taxation adopted will prove an impossible burden on bus and truck operators whose lines are justified by economy and the public interest.

BRITISH COLUMBIA has given four tracts of government land, containing an aggregate of 16,000,000 acres and valued at about $80,000,000, to the Pacific Great Eastern to enable the government to negotiate its sale. The grant was authorized by the Pacific Great Eastern Railway Act passed by the legislature of the province on December 18. The tracts of land, when selected by the government, are to be adjacent to the present lines or along the proposed extension to Peace River. The transfer is expected to attract bidders to the projected sale of the railway.

Annual Report of the Bureau of Locomotive Inspection

Shows a decrease of 31.3 *per cent in the number of accidents—*46 *per cent of the locomotives inspected were found defective*

OBJECTIONS to autogenous welding of parts of the locomotive or tender, where through the failure of such parts there is a possibility of accident and injury to persons, are again emphasized in the fourteenth annual report of the chief inspector of the Bureau of Locomotive Inspection to the Interstate Commerce Commission. In the thirteenth annual report, an abstract of which was published in the January 17, 1925, issue of the *Railway Age*, attention was directed to accidents investigated where welds made by the autogenous process were involved. It was stated in that report that approximately 78 per cent of autogenously welded seams involved in firebox failures were torn, as compared with 15.4 per cent of the riveted seams, and that the fatalities in cases where sheets tore during the period covered by the thirteenth annual report were about eight times as great as they were in failures where the sheets did not tear. During the 12 months period covered by the fourteenth annual report, numerous accidents of a similar nature have occurred, views of some of which are shown in the illustrations.



Approximately 23 ft. of Autogenously Welded Seams in This Firebox Failed at the Time the Boiler Exploded

ACCIDENTS CAUSED BY THE FAILURE OF SOME PART OR APPURTENANCE OF THE LOCOMOTIVE AND TENDER, INCLUDING THE BOILER

	1925	1924	1923	1922	1921
Number of accidents	690	1,005	1,348	622	735
Per cent increase or decrease from previous year	31.3	25.5	*117	15.4	12.8
Number of persons killed	20	66	72	33	64
Per cent increase or decrease from previous year	69.7	8.3	*118	48.4	3
Number of persons injured	764	1,157	1,560	709	800
Per cent increase or decrease from previous year	33.9	25	*120	11.3	12.6

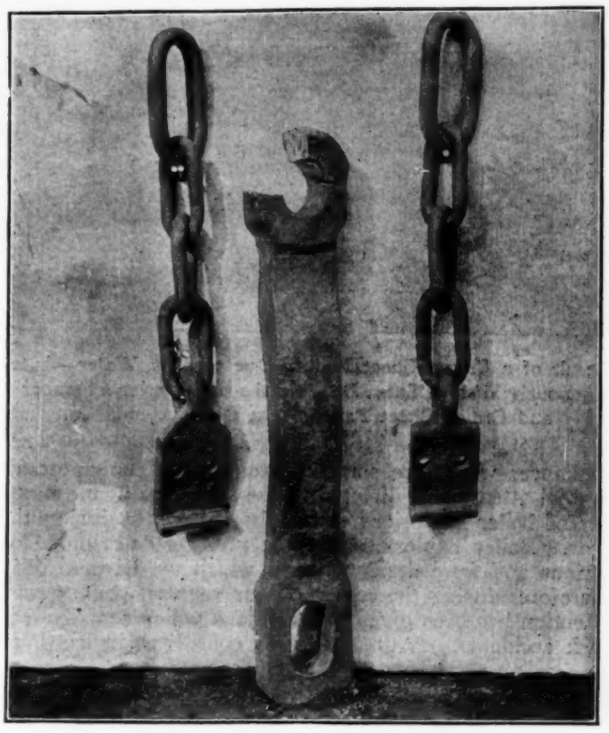
*Increase.

This report contains a summary of all accidents and casualties occurring during the year ending June 30, 1925. A total of 690 accidents occurred in the 12 months period covered by the report, a decrease of 31.3 per cent from that of the preceding period. With the exception of the 12 months period for 1921 and 1922, this is the lowest number of accidents reported since 1920. There were 20 persons killed during the period covered by this last report as compared to 33 killed in 1921-22, which was the lowest number of fatalities reported since 1920, until the report this year.

DERAILMENTS DUE TO DEFECTS IN OR FAILURE OF SOME PART OF THE LOCOMOTIVE OR TENDER

	1925	1924	1923	1922	1921
Number of derailments*	22	30	38	22	8
Number of persons killed	..	3	4	5	..
Number of persons injured	52	112	157	61	30

*Only derailments reported by carriers as being caused by a defect in or failure of parts of the locomotive or tender were investigated or counted.



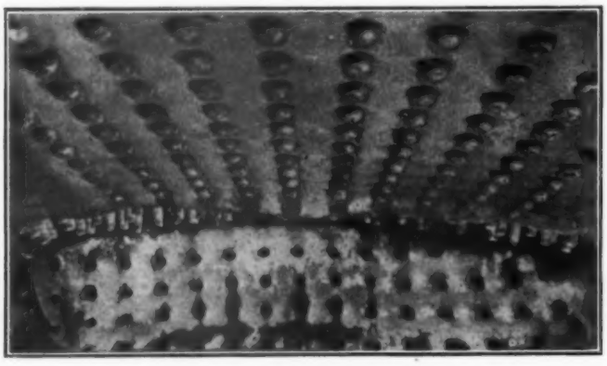
Drawbar and Safety Chains Which Failed Because of Crystallization of the Drawbar—The 7/8-in. Bolts Securing the Safety Chains Sheared When the Drawbar Broke

The greatest number of accidents was due to defective grate shakers of which there were 57. Fifty-three accidents were due to defective squirt hoses, 49 to defective reversing gears, 36 to defective flues and 31 to defective

brakes and brake rigging. Three fatalities were caused by defective brakes and brake rigging which stands second in the list of appurtenances causing fatal accidents, the greatest number of deaths being caused by boiler explosions. A total of 12 persons were killed on account of boiler explosions, 10 of which were due to crown sheet failures on account of low water, and two to defective staybolts in the firebox. An abstract of the report follows:

A summary of all accidents and casualties to persons occurring during the year ending June 30, 1925, as compared with the previous year, covering the entire locomotive and tender and all of their parts and appurtenances, shows a decrease of 31.3 per cent in the number of accidents, a decrease of 69.7 per cent in the number of persons killed and a decrease of 33.9 per cent in the number injured during the year. There was also a substantial decrease in the percentage of locomotives, inspected by our inspectors, found defective as compared with the previous year. During the year 46 per cent of the locomotives inspected were found with defects that should have been corrected before being put in use, while during the previous year, 53.4 per cent of those inspected were found defective.

While there was a substantial decrease in the total number of accidents occurring during the year, our investigation shows that a still greater decrease should have resulted had the requirements of the law and rules been complied with, especially so with respect to parts and



Result of a Crown Sheet Failure Due to Low Water—Autogenously Welded Seam Between the Combustion Chamber and Crown Sheet Failed for a Distance of 51 in.

appliances which are sometimes considered unimportant. Special attention is directed to the reduction in the number of boiler explosions caused by low water during the year. Boiler explosions are the most prolific source of serious and fatal accidents with which we have to deal, therefore, during the course of our regular work, special attention has been given to conditions which contribute to such accidents. A great deal of consideration has been given to the action of the water in the boiler and its effect upon the water indicating appliances and the result of our study in this matter has been brought to the attention of those in charge of locomotive maintenance and operation, as well as those actually operating locomotives. The

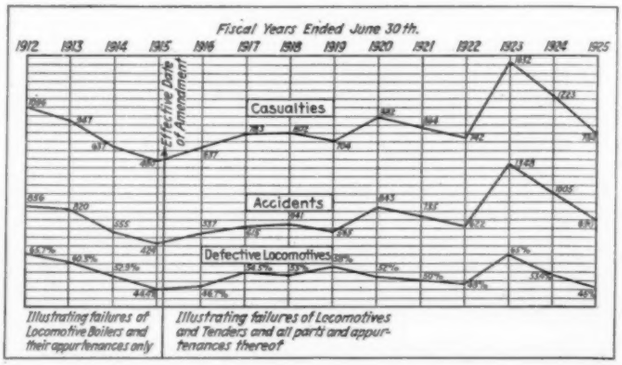


Chart Showing the Relation of Defective Locomotives to Accidents and Casualties Resulting from Locomotive Failures

reduction in the number of crown-sheet failures as shown is no doubt largely brought about as the result of our study with respect to the circulation of the water in the boiler and its effect upon water glasses and especially upon gage cocks when screwed directly into the boiler, and to our action in insisting that water indicating appliances and other parts, which may contribute to such accidents, be maintained to a high degree of perfection so that they will perform their functions in a proper manner.

The graphic chart shows the relation between the percentage of defective locomotives and the number of accidents and casualties to persons resulting from the failure thereof, and illustrates the effect of operating locomotives in a defective condition from the viewpoint of safety.

In the thirteenth annual report, attention was directed to accidents investigated where welds made by the autogenous process were involved. During the year, numerous other accidents of the same similar nature have occurred, our investigation of which serves to establish the soundness of our recommendation, previously announced, that this process has not yet reached a state of development where it can be safely used on parts of the locomotive or tender where through failure of such parts accident and injury to persons might result.

During the year ending June 30, 1925, 146 applications were filed for extension of time for the removal of flues, as provided in Rule 10. Our investigation disclosed that in 14 of these cases, the conditions were such that no extension could properly be granted. Fourteen were in such condition that the full extension requested could not be authorized, but an extension for a shorter period of time was allowed. Nineteen extensions were granted after

PERSONS KILLED AND INJURED, CLASSIFIED ACCORDING TO OCCUPATIONS

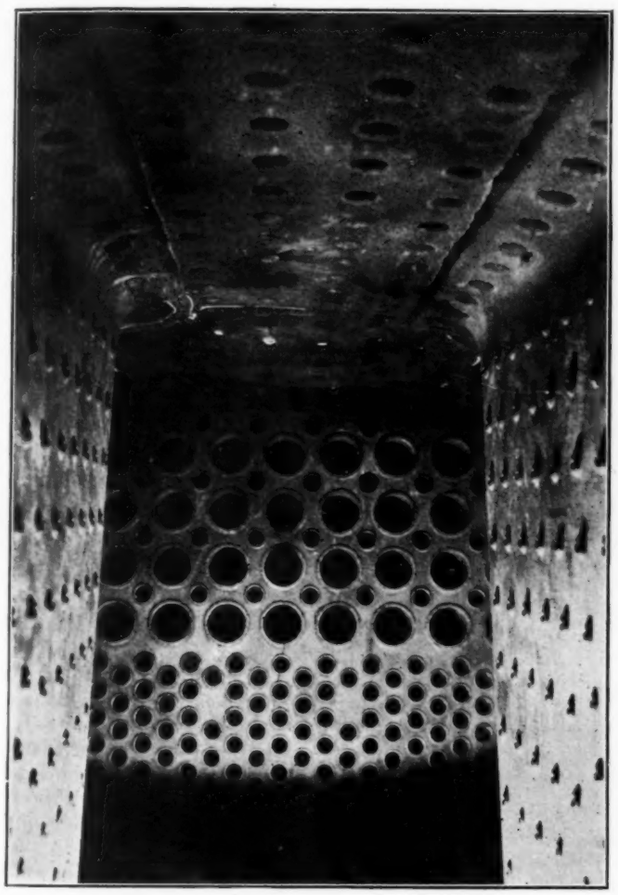
	1925		1924		1923		1922		1921	
	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Members of train crews:										
Enginemen	8	230	19	330	19	484	11	213	15	237
Firemen	6	300	22	434	16	597	10	277	25	360
Brakemen	2	84	9	102	12	137	7	66	13	64
Conductors	..	25	2	39	1	35	....	25	2	20
Switchmen	..	23	1	29	2	32	1	13	3	15
Roundhouse and shop employees:										
Boilermakers	..	6	1	24	3	19	1	10	1	7
Machinists	..	13	1	9	2	14	....	9	1	3
Foremen	..	....	1	6	1	6	....	1	1	3
Inspectors	..	2	1	3	....	2	....	2	....	5
Watchmen	1	3	....	5	1	6	....	3	....	4
Boiler washers	..	5	2	5	1	9	....	1	....	7
Hostlers	..	16	....	14	....	31	....	10	....	8
Other roundhouse and shop employees	..	10	6	34	4	29	1	15	1	25
Other employees	1	13	....	16	4	36	2	23	2	16
Non-employees	2	34	1	107	6	123	....	41	....	21
Total	20	764	66	1,157	72	1,560	33	709	64	800

defects disclosed by our investigation had been repaired. Eighteen applications were canceled for various reasons. A total of 100 applications were granted for the full period requested.

No formal appeal was taken from the decisions of any inspector during the year.

Amendment to the Law

The act of June 7, 1924, further amending the locomotive inspection law extended our jurisdiction to all locomotives and tenders, their parts and appurtenances, used or permitted to be used on the line of a common carrier subject to the Interstate Commerce Act, which includes locomotives propelled by electricity, gasoline, compressed air, or other means, whereas prior to this amendment, the law applied only to steam locomotives used by common carriers subject to the law. The amendment of June 7, 1924, also provided for the appointment of 15 additional inspectors. This number of inspectors was appointed and actively engaged in the performance of their duties for an average period of three months during the year ending June 30, 1925.



Crown Sheet Damaged on Account of Low Water—The Two Thermic Syphons Discharged Sufficient Water to Keep Part of the Crown Sheet from Becoming Overheated

The preparation of rules and instructions fixing minimum requirements for all locomotives other than those propelled by steam power is being pursued and arrangements are being made to put into effect the additional requirements as soon as possible.

The carriers having failed to file their rules and instructions for the inspection and testing of locomotives other than steam within three months after the amendment of June 7, 1924, became effective, it became my duty to prepare rules and instructions not inconsistent with the purpose of the law, which I did, in connection with which it has been deemed advisable to have a conference with the parties at interest for the purpose of coming to a common understanding so that the rules and instructions may be approved by the Interstate Commerce Commission as required by law.

Legal Assistance Asked for the Bureau

A large percentage of the accidents which we have investigated were caused by defects which could have been prevented had proper inspections and proper repairs been made at the proper time. Many locomotives are allowed to remain in use in apparent disregard for the requirements of the law, sometimes until accidents occur and many times until our inspectors find them and order them out of service. We are daily writing many letters to various carriers calling attention to their failure to comply with the requirements of the law, such as failure to make the required periodical inspections and tests and the failure to make proper repairs to defects which constitute violations of the law. With the large number of locomotives in service, scattered over such a wide area, it is apparent that Congress never intended that the law should be entirely enforced by our inspectors ordering locomotives out of service because of being in violation of the law. It is a physical impossibility for the 65 inspectors now provided to keep in sufficiently close touch with the number of locomotives coming under the jurisdiction of the law to know at all times that they are in condition to meet the requirements thereof.

Therefore, in the light of our experience, I most respectfully recommend that competent legal assistance be provided this bureau so that we may at all times have the benefit of such services in seeing that the law and the rules and regulations issued in pursuance thereof are complied with.

Great Northern Starts Work on Long Tunnel

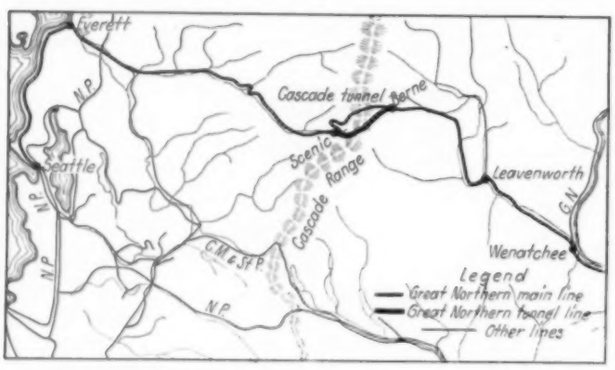
THE Great Northern has awarded a contract to A. Guthrie & Co., Inc., St. Paul, Minn., within the last few weeks for the construction of a change in its main line through the Cascade mountains, approximately 100 miles east of Seattle, that involves the driving of a tunnel 7.75 miles long—the longest railway tunnel in America. The present line which was built in 1892 crosses the divide at an elevation of 3,385 ft. above sea level. It has sharp grades and curves, numerous show sheds and several tunnels, the longest of which is 13,873 ft. in length. On account of the heavy snowfall, which reaches a maximum in a single season of 410 in. at Berne and 670 in. at Cascade tunnel, it is difficult and expensive to keep the line open for operation and many studies have been made in an effort to secure a new location with a lower crossing that would avoid the snow trouble. The increasing importance of a thoroughly dependable line, the fact that additional sheds were needed to keep the present line open, and the heavy repairs required annually on existing sheds and tunnels, brought expenditures to the point where a new line would show a substantial saving.

The new line as located will shorten the distance more than 7½ miles, eliminate nearly six complete circles of curvature and will escape most of the severe snow trouble. It involves the construction of a single track tunnel, 16 ft. wide, 22 ft. above the top of rail and 7.75 miles long, which is estimated to cost $10,000,000. A comparison of

the principal characteristics of the present and proposed line is as follows:

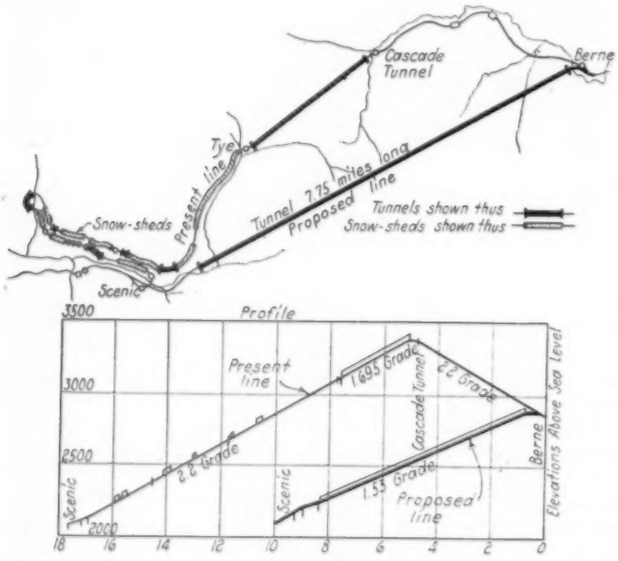
	Present Line	Proposed Line	Difference
Length	17.68 miles	10.01 miles	7.67 miles
Maximum curve	10 deg. .00 min.	5 deg. .00 min.	1,950 deg.
Total curvature	2,169 deg.	219 deg.	5 deg. .00 min.
Maximum grade	2.2 per cent	2.2 per cent	0 per cent
Tunnel grade	1.695 per cent	1.53 per cent	0.165 per cent
Summit elevation	3,385 ft.	2,879 ft.	506 ft.
Total rise westward	532 ft.	26 ft.	506 ft.
Total fall westward	1,299 ft.	793 ft.	506 ft.
Snowsheds, total length	6.04 miles	0.00 miles	6.04 miles
Bridges, total length	0.23 miles	0.04 miles	0.19 miles
Tunnels	3.66 miles	7.75 miles	4.09 miles

While the plan to be followed in the construction of this tunnel will depend largely upon the character of the



Location of the Great Northern's Crossing of the Cascades

material encountered, reliable information concerning which is not available it is the present intention to carry on construction operations at three points, from the portals at each end and from a shaft to be sunk near the point where a creek crosses the line of the tunnel about



Location Map and Profile at the Site of the Cascade Crossing

two miles west of the east portal. The pioneer tunnel, in conjunction with a center heading, will be driven between the shaft and the west portal, but it is probable that the center heading method alone will be employed between the shaft and the east portal.

This work will be carried out under the direction of J. R. W. Davis, chief engineer of the Great Northern, St. Paul, Minn., with Colonel F. Mears, assistant chief engineer at Seattle, in direct charge.

B. & O. Accounting Association

THE Baltimore & Ohio, by sponsoring the organization three years ago of the Baltimore & Ohio Railroad Accounting Association, has the distinction of having given impetus to the first association of that kind in the country.

The members of the association are special accountants, chief clerks, head clerks, secretaries, and other employees of the accounting, treasury, relief and claim departments who hold positions of a supervisory capacity. The principal object of the association is to afford its members an opportunity to exchange views on all matters of railway accounting which affect their daily work. Its other aims are the promotion of a spirit of friendliness among its members and the development of inter-departmental co-operation. Since its inception three years ago the association has been steadily growing, and at the present time has a membership of approximately 200 representatives from all the departments mentioned.

At its regular monthly meetings there are generally two principal speakers, the first usually being an officer of the railroad company or some person prominent in the political, economic or social life of the city of Baltimore, the state of Maryland, or the nation; and the second, some member of the association.

The first speaker, as a rule, chooses for his subject the line of endeavor in which he is engaged. An idea of the type of speakers and the variety of subjects which the members of the association have enjoyed, is given by the fact that among those of the group of company officials have been Daniel Willard, president, who spoke of his railroad career; George M. Shriver, senior vice-president, and J. J. Ekin, comptroller, who both featured accounting department matters; Archibald Fries, vice-president in charge of traffic, who discussed traffic problems; John J. Cornwell, general counsel, and former governor of West Virginia, who spoke of the legal aspects of a railroad.

Among the political, economic and social group are Albert C. Ritchie, governor of Maryland, who discussed the current problems of the state; John C. Box, member of Congress, who spoke of the immigration question; A. S. Goldsborough, executive secretary of the Merchants' and Manufacturers' Association of Baltimore; Eugene A. Edgett, assistant state's attorney; and F. W. Besley, Maryland state forester.

In most cases the members of the association who address the regular meetings outline the work of the bureaus or departments under their jurisdiction. After each meeting several hundred copies of the address are made and distributed to the members at the next meeting. In this way the members become acquainted with the duties performed by each other; and, by possessing a knowledge of the problems which confront their co-workers, they acquire a sympathetic understanding of the various situations and develop a spirit of hearty co-operation.

At intervals the association has special features at its meetings, such as the showing of the motion picture, "The Rolling Romance," produced by the Baltimore & Ohio. This is a picture dealing with the early history of the Baltimore & Ohio, supplemented by a little modern romance enacted on the "Capitol Limited." There was a lecture given by officials of the Chesapeake & Potomac Telephone Company, illustrating by motion pictures and models the various methods of operating the telephone, and the different types of telephones used. An illustrated lecture was given by George B. Shattuck, special representative of the company, on "My Adventures in Africa."

The present officers of the association are J. W. Sweitzer, president; J. C. McCahan, vice-president; Charles W. Lewis, secretary; and W. H. Orem, treasurer.

General News Department

The National Scale Men's Association will hold its annual convention at Chicago on March 9, 10 and 11; headquarters at the Auditorium Hotel. The president of this association is E. K. Lawrence, general scale inspector of the Baltimore & Ohio; secretary, A. G. Zeibel, Dallas, Tex.; chairman of executive committee, E. C. Jackson, Southern Pacific, Houston, Tex.

Details of the bill being drafted by members of the House of Representatives, the railroads and labor organizations to abolish the Railroad Labor Board, create a series of boards of adjustment and prohibit strikes until after a report by a "fact-finding" commission, were discussed with the President on Wednesday by Alfred P. Thom, representing the roads. A committee of labor executives was to discuss it with him on Thursday.

The Interstate Commerce Commission has extended the time specified for the fulfilment of its second train control order (January 14, 1924,) as to the Northern Pacific and the Chicago, Indianapolis & Louisville, from February 1, 1926, to July 18, 1926. The Richmond, Fredericksburg & Potomac and the Erie have also filed petitions for a similar extension of time. The Chicago & Erie has asked relief from the second order.

A report of progress in the construction of the Moffatt tunnel through the Continental Divide on the line of the Denver & Salt Lake west of Denver on December 15, shows that the pioneer or water tunnel and the main headings in the main tunnel are 76 per cent finished, while the main tunnel has been excavated to full section for a distance of 11,343 ft. in from the east portal and 4,463 ft. in from the west portal, a total of 15,806 ft. or 49 per cent of the total distance.

Use of Private Cars to Be Investigated

The Interstate Commerce Commission has ordered an investigation of the use of private passenger-train cars, including so-called office cars, in the transportation of persons, the order to apply to all Class I, Class II and switching and terminal railroads.

Cost of Fuel

The average cost per ton of coal used as fuel for road locomotives in freight and passenger train service, charged to operating expenses, for Class I railways in October, 1925, was $2.66 as compared with $2.85 in October, 1924, according to the Interstate Commerce Commission's monthly bulletin. Fuel oil cost 3.12 cents a gallon as compared with 2.82 cents in October, 1924. The total cost of coal and fuel oil for the month was $30,293,706, as compared with $29,888,414 in 1924. For the ten months ended with October the average cost of coal was $2.73, as compared with $3.08 in 1924. Oil cost 3.18 cents as compared with 2.78. The total cost of coal and fuel oil was $271,728,983, as compared with $295,671,213 in 1924. For coal alone the total cost was $217,334,932, as compared with $247,866,834.

Abolition of Grade Crossings in New York

Governor Alfred E. Smith in his annual address to the New York State legislature on January 6, speaking of railroad grade crossings and the amendment to the Constitution authorizing the expenditure of three hundred million dollars for the elimination of crossings, urges the legislature to proceed as rapidly as possible. "The legislature has the mandate of the people themselves." * * * "I feel that I should touch upon the necessity of careful study by the legislature of an agency for the carrying out of the constitutional amendment. I would suggest that a program for elimination be prepared by the Public Service Commission because of its contact with the railroad systems of the state. Supervision of execution of the work, outside of New York City, should be in the Department of Highways, which is thoroughly organized throughout the state and is under the control of trained engineers whose business it is to make a constant study of highway conditions within their districts.

"Within the City of New York, grade crossing elimination is unquestionably related to its city plan and in view of that fact the Board of Estimate and Apportionment, through its engineering departments, should be the agency to plan and have supervision of grade crossing removals."

Wisconsin Stoker Law

Railroads in Wisconsin have petitioned the federal court at Milwaukee, Wis., for an injunction restraining the state of Wisconsin from enforcing the law, recently passed, requiring the installation of mechanical stokers on large locomotives. A hearing on the motion will be held in Milwaukee on January 9, before three federal judges sitting en banc. Attorney-General Ekern of Wisconsin will oppose the motion. The mechanical stoker law was enacted by the 1925 legislature after a contest in which the passage of the bill was supported by railway labor organizations.

Union Pacific System Athletic League Organized

The Union Pacific System Athletic League was organized at a convention of the representatives of 34 employees' athletic clubs having a membership of 12,000 at Salt Lake City, Utah, on December 7 to 9. A constitution was adopted under which all athletic activities will be conducted solely for and by employees. Under the new plan of organization the company will continue to assist by arranging fields, furnishing material and paying part of the time of contestants in system meets.

All athletic contests on the Union Pacific will be conducted under national rules, including those of the Amateur Athletic Union with which the Union Pacific club will affiliate. By vote of the convention Union Pacific contestants will participate in the Amateur Athletic Union meet at Philadelphia, Pa., next summer in connection with the sesqui-centennial exposition.

Wage Statistics for October

The number of employees reported to the Interstate Commerce Commission by Class I railroads for the month of October, 1925, was 1,817,038, an increase of 13,511, or 0.7 per cent over the returns for the previous month. The total compensation increased $13,556,692 or 5.5 per cent. The increase in compensation is due principally to the fact that October had 27 working days, while September had only 25. Compared with the returns for the same month last year the employment in October, 1925, shows a decrease of 0.3 per cent while the total compensation increased 0.9 per cent. The number of employees at the middle of the month was as follows:

Group	October 1925	Increase over September 1925	Increase over October 1924
Executives, officials and staff assistants	16,585	82	311
Professional, clerical and general	282,977	360	714
Maintenance of way and structure	425,647	(d)3,161	4,717
Maintenance of equipment and stores	519,972	7,671	(d)19,826
Transportation (other than train, engine and yard)	211,901	(d)312	981
Transportation (yardmasters, switch tenders and hostlers)	24,007	92	(d)280
Transportation (train and engine service)	335,949	8,779	7,805
Total	1,817,038	13,511	(d)5,578

(d) Decrease.

New Cars and Locomotives

Class I railroads during the first eleven months of 1925 placed in service 123,858 freight cars, according to reports filed with the car service division of the American Railway Association. This was 24,973 cars less than the number installed during the corresponding period of 1924 and 53,987 less than during the same

period in 1923. The total placed in service in November was 4,615, including 1,726 box, 1,975 coal and 395 refrigerator cars. Freight cars on order on December 1 totaled 27,721, as compared with 45,095 on the same date in 1924 and 36,789 in 1923.

Class I railroads during the first eleven months in 1925 placed in service 1,604 steam locomotives, compared with 1,951 during the same period in 1924 and 3,704 during the corresponding period in 1923. The same roads on December 1 had 339 locomotives on order, compared with 265 on the same date in 1924 and 739 two years ago. During the month of November 112 locomotives were installed in service.

These figures as to freight cars and locomotives include new, rebuilt and leased equipment.

Commercial Stocks of Coal

On November 1, 1925, the stocks of bituminous coal in the hands of consumers amounted to approximately 48,000,000 net tons, according to the Bureau of Mines, Department of Commerce. This was a slightly larger amount than that in the corresponding period of 1924. On June 1, 1925, stocks amounted to 38,000,000 tons. Between June 1 and September 1, consumers added 5,000,000 tons of their total reserves, and between September 1 and November 1, another 5,000,000 tons. From the trend of production and consumption it is apparent that the flow of coal into storage has continued since November 1.

In comparing the stocks on different dates, it is necessary to consider the current rate of consumption, which varies. At the rate prevailing in September and October, when business was active and consumption large, the stocks on November 1 were sufficient to last 35 days. This may be compared with a supply of 45 days on September 1, 1924, when business was dull; and with a supply of 46 days on September 1, 1923, and 23 days on November 1, 1922. But these averages overlook the fact that stocks are never equally divided. Some consumers and localities are exceptionally well supplied, and others have practically no reserves.

In addition to the storage piles of consumers on November 1, there were 7,512,000 tons of bituminous coal on the docks of Lakes Superior and Michigan, at least 221,000 tons held in storage by producers at the mines or intermediate points, and 503,850 tons in railroad cars unbilled at the mines.

The total quantity of railroad fuel on hand November 1, according to the American Railway Association, was 10,600,000 tons, a supply sufficient to last 30 days.

Hearing on Reading Bus Permits

The Pennsylvania Public Service Commission reopened in Harrisburg on January 6 the hearing on the application of the Reading for permits to operate motor buses in Schuylkill county. Practically the whole period was taken up in cross-questioning E. D. Osterhout, passenger traffic manager of the company, who at the first day of the hearing, in November, made a detailed submission of the company's proposals.

Principal opposition to granting the permits comes from interurban electric lines in the territory and independent bus operators.

Cross-questioning brought out the fact that the railroad views its proposed bus operations in the light of service to be substituted for trains to be taken out of service and not as an invasion into a new field of transportation, which could be compared to transit service, with short headway and stops at every street corner. The railroad's buses would make stops only at corresponding railroad stations. It is true that more bus trips would be made than train trips abandoned, but this would be necessary, in view of the fact that buses carry but 29 passengers, compared with hundreds on trains.

It was made clear that the company's policy as to rates was to charge the same as on the railroad, making a variation only to the nearest 0 or 5. An exception would be made in cases where the bus route was considerably shorter than the rail route. In most cases it appeared that bus rates would be higher and service much less frequent than on local bus and electric lines. In a few cases, where electric railway routes, as well as the steam railroad, were circuitous, the bus rates would be lower than those charged by both railway lines.

One of the opposing attorneys asked the witness for cost estimates per mile of motor buses, rail motor cars and steam trains. Given the estimates on motor buses and steam trains, i. e., 30 cents on the former and $1 on the latter (out-of-pocket costs only on steam service), he asked for detailed supporting data on these figures. The witness being unable to present these as minutely as requested, the opposition asked for a continuation of the hearing to allow for the filing of this information and study of it by them, before proceeding with the cross-questioning. The request was granted over the railroad's protest.

A few days prior to the hearing the opposition served a *duces tecum* on the Reading with reference to certain facts which they wished to learn from the railroad. The railroad has filed its answer and the commission has not announced its decision in the matter, although it seemed to assent to the railroad's offer to present whatever facts were available from existing records.

A representative of the street railways' association of the state appeared before the hearing began and asked for an immediate adjournment to allow his association to endeavor to work out some kind of agreement with the railroad which would be mutually acceptable. His association "viewed with alarm" the threatened entrance of the railroads into this field. The request for adjournment was denied, with the assurance that before a decision was announced an opportunity would be given the street railway interests generally to air their views.

Railway Revenues and Expenses, November and Eleven Months

Class I railroads earned on their property investment during the first eleven months in 1925 at the annual rate of return of 4.83 per cent, according to reports compiled by the Bureau of Railway Economics. The net operating income was $1,041,689,000, as compared with $899,666,000 during the same period last year. Operating revenues amounted to $5,661,646,000, as compared with $5,481,488,000. Operating expenses totaled $4,193,065,000, as compared with $4,177,784,500.

For November net operating income amounted to $106,924,330, which is at the annual rate of return of 4.82 per cent; operating revenues totaled $532,746,600, compared with $505,797,650 during the same month in 1924; operating expenses $384,461,770, compared with $374,359,595.

Twenty-one Class I roads operated at a loss during November, of which 14 were in the Eastern district, one in the Southern and six in the Western district.

Class I railroads in the Eastern district for the eleven months reported a net railway operating income of $512,759,322; annual rate of return 5.19 per cent; net railway operating income $45,357,274, compared with $37,442,558 during the same month in 1924.

In the Southern District, Class I railroads for the eleven months had net of $151,934,091, which was at the annual rate of return of 6 per cent; for November alone, $14,810,147. In November, 1924, it was $12,358,371.

Class I railroads in the Western district for the eleven months excluding the Nevada Northern, whose report was late, had a net operating income of $376,995,300; annual rate of return 4.11 per cent; for November $46,756,911, as compared with $43,593,420 for the same month in 1924.

Harriman Medals Awarded

Mrs. E. H. Harriman, on Wednesday of this week, personally presented the E. H. Harriman Memorial medals, offered through the American Museum of Safety for the best accident prevention records on American railroads during 1924. These awards were published in the *Railway Age* of November 21, 1925, page 963. The presentation of the medals and certificates was made at a luncheon-meeting at the Bankers' Club of America in New York, Arthur Williams, president, and James Speyer, treasurer of the American Museum of Safety, being the hosts.

The E. H. Harriman gold medal for the best record in accident prevention among American railroads for the year 1924, which was awarded to the Union Pacific System, was received and acknowledged by Vice-President E. E. Calvin. The silver replica of the gold medal, awarded to the Western division of the Chicago Great Western, as the division on which the best safety record was made during 1924, was received and acknowledged by General Manager Hinkle of that road. President L. F. Loree, of the Delaware & Hudson, received a certificate of honorable mention for the very creditable accident prevention record made by his road. Similar mention was also made of the Duluth, Missabe & Northern.

Joseph Kragskow, assistant foreman in the Omaha shops of the Union Pacific, who was awarded the bronze medal offered to the

employee who individually had been most conspicuous in furthering accident prevention activities, was unable to be present to receive the medal. This was also true of H. E. Butler, passenger train conductor on the Nashville, Chattanooga & St. Louis, who was awarded a certificate of honorable mention.

At the close of the program announcement was made that Mrs. Harriman has authorized the American Museum of Safety to make similar awards for another year, and President Underwood, of the Erie, was designated as Mrs. Harriman's personal representative in acting with the committee which will have charge of making the awards.

Railroad Bills in Congress

Representative Newton of Minnesota has introduced a number of bills to amend various provisions of the interstate commerce act which covers practically the same ground as bills he introduced at the last session of Congress. H. R. 6362, introduced at the request of the National Industrial Traffic League, would amend section 15a to read as follows:

"Where carriers subject to this act are conducted under honest, efficient and economical management, they are entitled to the opportunity of earning a fair return on the value of their property devoted to the service of transportation, and the commission shall give consideration to such right in passing upon the rates, fares, and charges of such carriers; Provided that the commission shall have reasonable latitude to modify any particular rates which it may find to be unjust or unreasonable."

Another bill, H. R. 6360, would amend paragraphs 3 and 4 of section 13 of the act with reference to giving state commissions more authority over intrastate rates by providing that no order of the federal commission would have the effect of increasing rates applicable to intrastate commerce until the state commission had passed on the rates and reported its findings to the Interstate Commerce Commission and the latter had reviewed them.

H. R. 6359, introduced by Mr. Newton, relates to extension of credit for freight charges, the publication and posting of tariffs, and to the suspension of tariffs, giving the commission authority to suspend for an additional six months. H. R. 6361, also introduced at the request of the traffic league, would give shippers a right to appeal from decisions of the Interstate Commerce Commission for a court order to set aside a decision on points of law. H. R. 6385 is a reintroduction of a bill amending section 206 to compel the Railroad Administration to pay interest on reparation awards. H. R 6363 would amend the bill of lading act with reference to misdating of bills of lading and shipper's count. H. R. 6386 would amend section 1 so that boat lines on the Great Lakes could not abandon service without the authority of the Interstate Commerce Commission.

Representative Taylor of Colorado has introduced a fourth section bill similar to the Gooding bill in the Senate.

Senator Harris of Georgia has introduced a bill, S. 2002, to reduce by at least 50 per cent the rail and water rates on wheat, corn and cotton to be exported in vessels owned by the United States.

Chairman Watson of the Senate committee on interstate commerce has announced that hearings on Senator Cummins' railroad consolidation bill will begin on January 11.

The Senate on January 4 adopted a resolution introduced by Senator Reed of Pennsylvania directing the Interstate Commerce Commission to transmit to the Senate at the earliest possible moment a statement showing in detail the number and nature of the reports which the commission now requires to be made by the railways and the expense to the railways of preparing them; also a statement as to the reports which can, in the judgment of the commission, be dispensed with without detriment to the public interest. The commission was also asked to furnish similar information as to reports to state commissions, in so far as the information is available to it.

Representative Jarrett has introduced a bill to amend the interstate commerce act so that its provisions shall not apply to the territory of Hawaii.

Hearings on Senator Gooding's bill to prohibit fourth section relief for the purpose of meeting water competition were begun before the Senate committee on interstate commerce on January 6, with Gen. T. Q. Ashburn, chairman of the Inland Waterways Corporation, as the first witness. General Ashburn read a long statement, similar to a speech he has been making at various waterway meetings, urging the importance of developing transportation on inland waterways and condemning the rate-making policy by which railways have met waterway competition in the past. He said that capital will not be invested in the development of interior points as long as there is danger of rate discrimination by the railways in favor of competing points located on water lines and that the purpose of the government in operating the inland waterway lines on the Mississippi and Warrior rivers is to demonstrate the possibilities of such water transportation and the fact that they are beneficial to all the people so as to induce the investment of private capital in such transportation later. He said the railways should not be allowed to make rates in such a way as to destroy water competition. His testimony was to be continued on the following day, and the committee decided to hold further hearings on January 18, 19 and 20, when Commissioner Esch, of the Interstate Commerce Commission, will be heard, among other witnesses.

Canadian Roads Improve Position

For the first eleven months of 1925 the net revenues of the Canadian National totaled $26,916,205, as compared with $14,483,968 in the same period of 1924 and $16,723,089 in 1923. For the month of November the net revenues were $6,430,484, an increase of $2,716,180 over the same month in 1924 and an increase of $1,822,107 over 1923.

	1925	1924	Inc. per cent
November			
Ry. op. rev.	$24,675,451	$20,946,123	17.80
Ry. op. exp.	18,244,967	17,231,819	5.88
Ry. op. net	6,430,484	3,714,304	73.13
Eleven Months			
Ry. op. rev.	$221,119,532	$216,271,446	2.24
Ry. op. exp.	194,203,327	201,787,478	3.76
Ry. op. net	26,916,205	14,483,968	85.33

For the month of October the operating ratio of the Canadian National System, 69.25 per cent, was the lowest since the amalgamation of the system. Gross revenues aggregated $23,761,136, being $610,465 greater than in October, 1923, the previous high month, and with operating expenses at $16,455,300 the net operating revenues amounted to $7,305,836. This was an increase of $3,144,686 over October, 1924, and of $2,577,828 over October, 1923. Maintenance of way and structures was reduced $63,940, or 2 per cent from last year's expenses, and maintenance of equipment and expenses were increased by $737,043, or 25 per cent. Freight traffic showed an increase over last year of 26.6 per cent, and passenger traffic was heavier by 14.8 per cent. Freight train loading increased from 648.3 net tons to 697.3 net tons, with the average car load one ton heavier. The net operating revenues of the United States lines were greater than those of October, 1924, by $3,466,115. For the ten months of 1925 the net operating revenues of the Canadian lines were increased by $7,840,730, for the United States lines by $1,875,326 and for the entire system by $9,716,056.

Canadian Pacific gross revenues for October, 1925, were $19,527,588, or $253,376 greater than in 1924. Freight traffic showed an increase over last year's of 2 per cent; the heavy movement starting so much earlier this year made the big increase in September, and, although passenger traffic showed an increase of 6.1 per cent, passenger receipts were less by $34,907. Mail and express revenues also showed slight declines. Maintenance expenses were reduced for both way and structures and equipment, total operating expenses being less by $224,774, or 1.8 per cent. For the ten months of 1925 gross revenues and operating expenses were less than in 1924, but net operating revenues were increased by $2,525,488.

Total operating revenues of the Canadian Pacific Railway for October, 1925, were $19,527,588.31, as compared with $19,274,211.51 in 1924; operating expenses were $11,958,821.97, as compared with $12,183,596.32; net operating revenues were $7,568,766.34, as compared with $7,090,615.19; and operating income was $7,444,027.08, as compared with $7,022,177.23. For the first ten months of 1925 operating revenues were $143,766,263, as compared with $147,324,927.86 in the first ten months of 1924; operating expenses were $114,379,673.48, as compared with $120,463,826.24; net operating revenues were $29,386,589.52, as compared with $26,861,101.62; and operating income was $29,079,949.01, as compared with $27,468,059.49.

Canadian Pacific net earnings for the month of November were $6,248,034, or a gain of over $200,000 over the same month last year, while the net operating revenue for the eleven months of 1925 were $35,327,983, an increase of nearly $2,000,000 over the same period in 1924.

As for net, it was the best November the road has had since 1915, and the second best on record, although in 1923 the November gross exceeded that of this year by three millions.

The cumulative record for the eleven months of the year shows gross at its lowest since 1919, but net for the period at its highest since 1917.

Gross earnings, operating expenses and net for the month of November and for the eleven months are compared in the following:

November—	1925	1924	Inc.
Gross	$19,294,184	$18,100,945	$1,193,239
Oper. exp.	13,046,149	12,071,064	975,085
Net	$6,248,034	$6,029,881	$218,153
Eleven months—			
Gross	$163,537,460	$166,811,984	*$3,274,523
Oper. exp.	128,209,477	133,314,044	*5,014,567
Net	$35,327,983	$33,497,940	$1,830,043

*Decrease.

Illinois Central Land Grant Proved a Liability

In replying to comments made by the St. Louis Post Dispatch, St. Louis, Mo., upon an address delivered by President Markham before the Traffic Club of St. Louis on December 1 on railroad land grants, Mr. Markham has shown that the land grant received by the Illinois Central has proved a liability rather than an asset. "The Illinois Central," he said, "lost approximately $36,000,000 from 1856 to 1924, inclusive, and received from the land grant a benefit of approximately $26,500,000, leaving a deficit of approximately $9,500,000, which deficit will increase as time goes on. The government land received by the Illinois Central through the state of Illinois amounted to 2,595,133 acres. The land had been held by the government at $1.25 an acre, with few buyers. At that rate the entire land grant could have been bought by the Illinois Central for approximately $3,250,000, while the 17,000 acres necessary for the right-of-way alone would have cost only $21,250.

"The state and federal governments were benefited by reason of this grant and the building of the railroad which followed it. As in the case of other land grants to railroads, alternate sections were ceded through the territory of the proposed railroad, and the price of the remaining sections was advanced from $1.25 to $2.50 an acre. The building of the Illinois Central opened up central Illinois for development, with the result that the federal government actually gained in the transaction by having a greatly improved market upon which to sell its remaining lands at the advanced price.

"The state government benefitted also, and it is still benefitting. The charter of the Illinois Central provides that the railroad shall pay into the state treasury annually, in lieu of other taxes, a special tax of 7 per cent of the gross earnings of its charter lines. At the beginning the amount was small, but up to the end of 1924 the charter tax on gross earnings totaled $61,195,864, and is now running at the rate of more than $3,000,000 a year. If the charter lines of the Illinois Central had been taxed from 1856 to 1924, inclusive, upon the same basis as other railway property in Illinois, it has been estimated that the railroad would have paid into the state treasury approximately $28,500,000 less than it actually did pay.

"To this loss by reason of the charter tax must be added the deductions in rates to which the federal government has been entitled by virtue of the fact that the Illinois Central is a land grant railroad. Rates for mail transportation on the charter lines of the Illinois Central are 80 per cent and for freight and passenger transportation performed for the government are 50 per cent of stipulated rates. Up to the end of 1924 such reductions on the part of the Illinois Central charter lines totaled nearly $7,500,000. Adding this amount to the excess charter tax paid gives a total loss on the part of the Illinois Central by reason of the land grant of approximately $36,000,000.

"All but a small part of the land granted has been disposed of by the Illinois Central. Most of this land was sold to early settlers and the price per acre averaged less than $10, the total net receipts to date being approximately $23,000,000. To this must be added the 17,000 acres of right-of-way still in use, which, at a liberal estimate of $200 an acre, would be worth close to $3,500,000, making the total benefit from the land grant approximately $26,500,000."

Traffic News

The next meeting of the Mid-West Regional Advisory Board will be held at Peoria, Ill., on January 20.

The twenty-first annual convention of the Passenger, Ticket and Freight Agents' Association of Texas will be held at the Baker hotel, Dallas, Tex., on January 16 and 17.

The Canadian National is opening no new export route via Baltimore, Md., that would divert grain from Canadian ports, according to a statement made last week by Sir Henry Thornton in denial of a dispatch appearing in a Halifax newspaper.

The Milwaukee Association of Commerce announces that Harry J. Bell has been appointed executive director, succeeding L. C. Whittet. Mr. Bell, formerly in the safety department of the Chicago & North Western, has for the past 2½ years been manager of the safety division of the Milwaukee Association of Commerce.

In order to handle the exceptionally heavy passenger traffic from the state of Ohio to Los Angeles, Cal., on January 6, a special Ohio section of the Golden State Limited was operated from Cleveland, Ohio, over the Cleveland, Cincinnati, Chicago & St. Louis, the Chicago, Rock Island & Pacific, and the Southern Pacific.

A special train of 43 cars of fish was shipped over the Canadian National from Prince Rupert, B. C., on December 17 for eastern Canada and United States points. The shipment consisted of frozen halibut and salmon. On the same day seven carloads of fish were shipped on regular passenger trains and on the day after Christmas 15 carloads were shipped.

The International-Great Northern has inaugurated through passenger service between Ft. Worth, Tex., and Galveston. "The Star" was chosen as the name of the new train from more than 2,000 names submitted in a contest held among employees. The new train leaves Ft. Worth at 10:45 p. m. and arrives at Galveston at 9:25 a. m. Northbound, the train leaves Galveston at 7:10 p. m. and arrives at Ft. Worth at 7:55 a. m.

Record Grain Shipments in Canada

It has been a bumper year for the Canadian railways in the handling of Western grain from prairie points to the head of the Lakes at Fort William and Port Arthur. Final figures of grain shipments from those two ports since the commencement of the grain season on August 1 last to the close of navigation on December 15 furnish an indication of what the railways did. There was a total of 220,781,877 bushels of all grains sent from those two ports in that period.

Canadian Roads to Reduce Competition

George P. Graham, Canadian Minister of Railways and Canals, announced last week that traffic and operating officers of the Canadian National and Canadian Pacific had constituted themselves a permanent joint committee to deal in a large and fair way with all questions of competitive service and to effect economies wherever possible by the elimination of duplicate train service.

Already the Canadian National has eliminated a number of trains in Ontario and other parts, trains that either duplicated a service already existing or that served at times and in places no longer found to pay. The saving to the Canadian taxpayers, who are the shareholders of the Canadian National System, by these eliminations is estimated at about $1,000,000 annually.

I.C.C. Issues Service Order in Florida Traffic

The Interstate Commerce Commission on December 28 entered Service Order No. 43 opening up all available routes on freight traffic to and from the state of Florida, regardless of routing. Accumulations exist and have existed for some time past at various gateways, principally Jacksonville. "This not only slows up the movement," said the commission's press notice regarding

the order, "but results in a substantial decrease in the amount of traffic that should be handled. The service order contemplates that the carriers will route traffic via the routes most available to expedite its movement and prevent congestion up to the reasonable limitations of such routes. This action should materially relieve the Jacksonville gateway, and increase and expedite the flow of traffic into and from the state of Florida."

This followed a conference on December 24 called by the commission, at which the officers of the roads were questioned by Commissioners Esch, McManamy and Cox. The Florida roads were represented by W. R. Kenan, Jr., president of the Florida East Coast; P. R. Albright, vice-president of the Atlantic Coast Line; M. H. Cahill, vice-president of the Seaboard Air Line, and H. W. Miller, vice-president of the Southern.

Santa Fe Establishes Indian Detour Trip

A three-days personally conducted motor trip through ancient Indian pueblos and prehistoric cliff dwellings in the New Mexico Rockies between Las Vegas, New Mex., and Aulbuquerque, as a part of its trans-continental service, will be inaugurated by the Atchison, Topeko & Santa Fe on May 15, 1926, and will be conducted daily thereafter the year round. The tour comprises visits to the city of Santa Fe and the inhabited Indian pueblos of Tesuque, Santa Clara, San Juan, Santo Domingo and other places in the valley of the Upper Rio Grande as well as the communal ruins of Puye, a cliff pueblo 20 centuries old.

Closed automobiles will be used on the tour, which covers 300 miles. The cost of the trip will be $45 per capita which includes all expenses.

Besides a regular three-day tour a series of additional optional motor-car side trips at low rates will be available for passengers who wish to include the Indian pueblos of Taos, the Frijoles Canyon cave dwellings in Bandelier National Monument, the Mesa Encantada, the Acoma and the Laguna.

Passengers on the westbound California Limited and the Navajo will detrain at Las Vegas, New Mex., where the motor cars will leave from the Castaneda station hotel. Passengers on the Navajo will rejoin their train at Albuquerque the evening of the third day. Those on the California Limited will remain overnight at the Alvarado station hotel, Albuquerque, taking the train the next morning.

The Indian detour will also be available for eastbound passengers on the California Limited and the Navajo, in which case passengers will leave their trains at Albuquerque and join them at Las Vegas. Private motor service will be available at an extra charge.

Rate Hearing Opened at Kansas City

The final hearing before the Interstate Commerce Commission on the application of western carriers for a 5 per cent increase in freight rates was opened at Kansas City, Mo., on January 5. The hearing is expected to last three weeks. H. M. Slater, speaking for the Illinois Commerce Commission, opposed the 5 per cent increase on the ground that Illinois, lying between the eastern and western districts, has its freight rates increased from both directions. He said that since 1913 rates affecting Illinois have shown a 40 per cent increase, a 25 per cent increase and a 5 per cent increase on general commodities. In addition, there has been an increase on coal rates of 15 cents a ton.

U. G. Powell, speaking for the Nebraska State Railway Commission, said that until the western railroads shall have increased their receipts from passenger service to a point where they are as profitable in proportion as freight receipts they ought not to be permitted to add 5 per cent to their freight rates. He presented an exhibit to show that passenger returns were proportionally far less in the west than in the east or south, and that passenger service returns have been declining in the west for several years. He suggested increases in fares which he declared would increase revenue and not diminish travel, if judiciously applied. The summer tourist fares, he said, are notably lower than they should be. The fare for travel to and from the Pacific coast is sometimes as low as one cent a mile. He suggested a reduction of passenger train service between large centers and the operation of electric or gasoline cars in local service. A study of the problem presented to the railways by bus and automobile competition and an increase in passenger fares should be undertaken as the most effective means of dealing with the passenger problem.

Commission and Court News

Interstate Commerce Commission

The commission has denied the petition of the American Publishers' Conference for leave to intervene in the railway mail pay case in which the railroads have applied for higher rates.

The Interstate Commerce Commission has ordered cancelled certain tariffs filed by the American Railway Express Company proposing the discontinuance of certain commodity rates on fruits and vegetables in carloads between Mountain-Pacific and eastern and central territories. The tariffs had been suspended until December 30, 1925, after protest by the American Fruit and Vegetable Shippers' Association and others.

The commission has disapproved proposed changes in the rules, regulations and practices affecting the refrigeration and handling of perishable freight and has ordered them cancelled, but without prejudice to the filing of new schedules which will provide for transporting not to exceed 7,500 lb. of top ice at the rates named in the schedules, instead of the 5,000 lb. there allowed. The finding is without prejudice to either the shippers or the railroads again bringing the matter to the attention of the commission on completion of the co-operative investigation which the commission is now conducting with the Department of Agriculture regarding the practice of top-icing.

Personnel of Commissions

Senate Committee to Question I. C. C. Nominees

The Senate committee on interstate commerce, to which has been referred President Coolidge's nominations of Thomas F. Woodlock and Richard V. Taylor for appointment to the Interstate Commerce Commission, considered the question of their confirmation at a meeting on January 6, and decided to call Mr. Woodlock before the committee for questioning on January 8 and Mr. Taylor on January 11. The confirmation of the two nominees is being opposed by a number of southern Senators and also by the Progressives.

McChord Resignation Effective

President Coolidge on December 31 accepted the resignation of C. C. McChord as a member of the Interstate Commerce Commission, effective on January 1, without waiting for the confirmation of his successor by the Senate. In the letter accepting the resignation the President said:

"It is unnecessary for me to state how much I have appreciated the high quality of your public service. Over a long period of time as an officer of the state of Kentucky, and of the United States in the regulation and control of the railroads, you have made a record of candor and wisdom which sets a high mark in public life. While I have been gratified at your official accomplishments, I have been even more gratified at your friendship, which has extended over the entire period of my residence in Washington."

State Commissions

The New York State Public Service Commission has approved plans for eliminating the grade crossing of Elmwood avenue, Rochester, N. Y., with the Erie and the Lehigh Valley; but the order states that work is not to be begun until the commission shall issue an order, following the appropriation by the state legislature of the funds necessary to pay the state's share of the cost. The plans provide for closing these two crossings and the establishment of a new under-grade crossing, 450 ft. south of the present location. There are to be two double track bridges, each of four spans, reinforced concrete. As the new crossing (and new street) will be wider than the roadway now in use, the commission decides that the city shall pay a part of the share which would be borne by the state if the change were to be confined to the present location.

Equipment and Supplies

Locomotives

THE HOCKING VALLEY is asking for prices on the repair of from one to sixteen Santa Fe type locomotives.

THE POTLATCH LUMBER COMPANY has ordered one 2-6-6-2 type locomotive from the Baldwin Locomotive Works.

THE GULF, MOBILE & NORTHERN has ordered 5 Mikado and 4 Pacific type locomotives from the Baldwin Locomotive Works.

THE UNION PACIFIC has ordered nine 4-10-2 three-cylinder type locomotives from the American Locomotive Company. Inquiry for this equipment was reported in the *Railway Age* of December 12.

THE MOBILE & OHIO has ordered 5 Mikado type locomotives and 4 Pacific type locomotives from the Baldwin Locomotive Works. Inquiry for this equipment was reported in the *Railway Age* of December 12.

Freight Cars

THE FRUIT GROWERS EXPRESS is inquiring for 300 underframes.

THE JONES & LAUGHLIN STEEL COMPANY is inquiring for 16 tank cars.

THE OLIVER IRON MINING COMPANY is inquiring for 50 double drop ore cars.

THE KANSAS CITY, MEXICO & ORIENT will construct 50 box cars in its own shops.

THE GREAT NORTHERN is expected to enter the market for 1,000 automobile cars.

THE ST. LOUIS SOUTHWESTERN is inquiring for 26 steel underframes for caboose cars.

THE WICHITA FALLS & SOUTHERN has ordered 50 box cars from the American Car & Foundry Company.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is inquiring for from 50 to 100 ballast cars and 75 flat cars.

THE MANATI SUGAR COMPANY has ordered 50 cars for export, from the American Car & Foundry Company.

THE AMERICAN TAR PRODUCTS COMPANY is inquiring for 50 tank cars of 50 tons' and 8,000 gal. capacity.

THE CHICAGO, ROCK ISLAND & PACIFIC is expected to enter the market for 2,750 miscellaneous freight cars.

THE SOUTH AFRICAN RAILWAYS are inquiring through the car builders for 25 high-side gondola cars of 76 tons' capacity.

THE NEW YORK, CHICAGO & ST. LOUIS has ordered 200 freight car steel underframes from the Pressed Steel Car Company.

THE ILLINOIS CENTRAL plans to purchase three or four thousand miscellaneous freight cars and some passenger equipment.

THE GOODWIN-GALLAGHER SAND & GRAVEL COMPANY has ordered 12 hopper cars of about 50 tons' capacity from the Magor Car Corporation.

THE ILLINOIS CENTRAL has ordered 400 automobile cars from the American Car & Foundry Co. and 400 from the Pullman Car & Manufacturing Co.

THE CHICAGO, BURLINGTON & QUINCY has changed its inquiry, reported in the *Railway Age* of December 26, from 1,500 box cars to 1,000 box cars.

THE SOUTHERN PACIFIC is constructing 500 freight cars in its shops at Sacramento, Cal. This company is expected to enter the market for 2,000 freight cars.

THE UNITED ALLOY STEEL CORPORATION has ordered 15 gondola cars from the Canton Car Company. Inquiry for this equipment was reported in the *Railway Age* of October 10.

THE MOBILE & OHIO has ordered 500 automobile box cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of December 12.

THE MISSOURI PACIFIC is inquiring for 600 double-sheathed box car bodies of 40 tons' capacity and repairs to trucks. The company is also asking for 50 gondola cars of 70 tons' capacity.

THE CHICAGO & NORTH WESTERN has ordered 250 Hart improved ballast and work cars from the Rodger Ballast Car Company. Inquiry for this equipment was reported in the *Railway Age* of December 26.

THE NEW YORK CENTRAL has ordered 500 automobile box cars of 55 tons' capacity from the Standard Steel Car Company. This is in addition to 500 previously ordered from the same builder and reported in the *Railway Age* of December 12. This company is also having new bodies placed on old trucks to 500 gondola cars in its Ashtabula, Ohio, shops and on 500 in its East Rochester, N. Y., shops.

Passenger Cars

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is inquiring for 4 steel baggage cars.

LOCOMOTIVES ORDERED, INSTALLED AND RETIRED

Month—1925	Domestic orders reported during month	Installed during month	Aggregate tractive effort	Retired during month	Aggregate tractive effort	Owned at end of month	Aggregate tractive effort	On order first of following month	Building in R. R. shops
January	27	167	7,455,971						
February	49	125	6,233,494	213	6,242,079	64,824	2,590,525,478	280	81
March	106	138	6,249,721	169	5,118,878	64,779	2,591,618,849	293	77
April	84	171	7,498,252	170	4,888,933	64,747	2,592,979,637	315	83
May	51	147	7,930,840	409	13,126,135	64,509	2,587,347,354	340	82
June	16	179	9,746,100	172	5,329,461	64,484	2,589,912,779	329	80
July	39	139	7,208,534	224	8,296,659	64,435	2,591,286,720	279	66
August	26	147	8,384,262	170	5,602,619	64,420	2,593,971,635	250	59
September	*86	129	7,981,464	210	5,866,368	64,357	2,596,489,549	193	45
October	199	150	7,284,850	229	8,601,871	64,257	2,595,729,142	237	37
November	101	112	8,862,352	266	7,930,271	64,142	2,595,082,839	218	33
December	216	...	.....	394	15,659,796	63,869	2,588,576,535	339	32
Total for 11 months	...	1,604	.....	....	.....	.....	.....	...	..
Total for 12 months	*1,055	...	.....	....	.....	.....	.....	...	..

Details as to orders from *Railway Age* weekly reports. Figures include all domestic orders placed with builders and railroad shops, but not rebuilt equipment.

Figures as to installations and retirements prepared by Car Service Division, A. R. A., published in Form C. S. 56 A-1. Figures cover only those roads reporting to the Car Service Division. They include equipment received from builders and railroad shops. Figures of installations and retirements alike include also equipment rebuilt to an extent sufficiently so that under the accounting rules it must be retired and entered in the equipment statement as new equipment. Figures as to orders as given in first column of table are not therefore comparable with figures relating to installations given in succeeding columns.

* Corrected figure.

THE MOBILE & OHIO has ordered 6 combination baggage and express cars and 4 coaches from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of December 5.

THE CHICAGO, BURLINGTON & QUINCY will rebuild a number of passenger coaches in its own shops. An inquiry has been issued for 25 steel underframes for the first lot to be rebuilt. Additional cars will be rebuilt from time to time, the total to aggregate 110.

THE MISSOURI PACIFIC has ordered 2 club cars, 3 straight coaches, 3 divided coaches, 2 chair cars, 2 mail and coach cars, 2 steel chair cars, 2 combination coach and baggage cars and 2 combination passenger, baggage and mail cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of December 26.

Iron and Steel

THE PERE MARQUETTE has ordered 135 tons of structural steel from the American Bridge Company.

THE LOUISVILLE & NASHVILLE has ordered 100 tons of structural steel from the American Bridge Company.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for 900 tons of structural steel for track elevation at Chicago.

Machinery and Tools

THE GREAT NORTHERN has ordered a 90-in. driving wheel lathe from the Niles-Bement-Pond Company.

THE ST. LOUIS-SAN FRANCISCO has ordered a 48-in. car wheel borer from the Niles-Bement-Pond Company.

THE LOUISVILLE & NASHVILLE has ordered three 36-in. by 17-ft. engine lathes from the Niles-Bement-Pond Company.

THE CANADIAN NATIONAL has ordered a 400-ton double-end wheel press from the Niles-Bement-Pond Company.

THE NEW YORK CENTRAL has ordered one 10-ton traveling gantry crane from the Cleveland Crane & Engineering Co.

THE NEW YORK CENTRAL has ordered a 90-in. locomotive axle journal turning lathe from the Niles-Bement-Pond Company.

THE GREAT NORTHERN is in the market for the following equipment:

A 44-cu. ft. electric drive air compressor, Ingersoll-Rand type ER-1 short belt drive.
A 16-in. by 60-in. riveted air receiving tank for A. S. M. E boiler code, 200-lb. working pressure.
One forge complete.
A combination press with full equipment.
A Peerless Universal high speed shaping saw.
A Cincinnati type FTA 220-volt, 60-cycle, 3-phase heavy duty floor grinder and buffer.
A Rapidayton dual-cylinder, continuous discharge No. 200 gasoline pump.
Two 1-gal. oil pumps.
Two 550-gal., 36-in. by 44-in. by 87-in. oil tanks.
A 12-in. to 14½-in. swing over shear by 6-ft. bed, Lodge & Shipley selective head lathe.
A 2 hp., 900 r.p.m., 60-cycle, 3-phase, 220-volt constant speed motor with starter and motor belt complete.
A 22-in.—24½-in. swing over the shear by 10-ft. bed, Lodge & Shipley selective head engine lathe.
A 10-hp., 900 r.p.m., 3-phase, 60-cycle, 220-volt constant speed motor with starter and belts complete.
A 21-in. Cincinnati Bickford upright stationary head heavy pattern drill.
A 2-hp., 1,200 r.p.m., 3-phase, 60-cycle, 220-volt constant speed induction motor.
A 10-in. Stecher high-speed, motor-driven drill press with standard belts complete.

Signaling

THE SOUTHERN PACIFIC contract recently let to the Union Switch & Signal Company (and noticed in the *Railway Age* of January 2, page 162) includes 292 semaphore signals; 219 one-arm and 73 two-arm. Besides the sections aggregating 280 miles, as noted, 40 of these signals are for use at various other points. The 280 miles is made up of three sections as follows: Picacho, Arizona, to Raso, 145 miles, of which 48 miles is double track. Oakridge, Cal. to Natron, 33 miles. Grass Lake, Cal. to Kirk, 102 miles. Total, 280 miles; 189 one-arm signals, 63 two-arm.

Supply Trade News

The Norwood-Noonan Company, Chicago, has moved its offices to 440 West Superior street.

The National Lock Washer Company has changed its Chicago address from 1535 Lytton building to 1103 Straus building.

The Kalman Steel Company, Chicago, will construct a one-story and basement addition, 50 by 68 ft., to cost $35,000 with equipment.

James H. Watters has been appointed assistant to the president in charge of sales of the **New York Air Brake Company,** New York.

Walter H. Stephens, consulting and designing mechanical engineer, has opened a new office at Room 539, Monadnock Block, Chicago.

The Ludlum Steel Company, Watervliet, N. Y., is making additions to its plant, to be completed and ready for occupancy early in January.

The Austin Company, Cleveland, O., has opened an office in Miami, Fla., in charge of H. L. Cornelison, formerly sales engineer at Cleveland.

The Celotex Company has purchased property at Marrero, La., and plans the construction of a new unit for its plant at that point to cost $1,500,000.

The Lundie Engineering Corporation on January 15 will remove its offices from 920 Broadway to the Murray Hill building, 285 Madison avenue, New York.

The Globe Steel Tubes Company, Chicago, has moved its Chicago office from the Peoples Gas building to Rooms 516 and 517 Wrigley building, 400 North Michigan avenue.

G. T. Aitken, formerly sales manager of the Vonnegut Machinery Company, Indianapolis, Ind., has become associated with the Indianapolis plant of **Fairbanks, Morse & Company.**

J. I. Byrne, formerly chief engineer of the **Texas Carnegie Steel Association,** Galveston, Tex., has been appointed general manager of the Orange Car & Steel Company, Orange, Tex.

F. C. Horner has been appointed assistant to the vice-president of the **General Motors Corporation,** New York, in charge of development of the commercial motor vehicle field on steam and electric railways.

The Morton Manufacturing Company, Chicago, has purchased the property adjacent to its present plant and is planning the construction of an addition which will provide 50,000 sq. ft. of additional shop space.

George N. DeGuire, formerly manager, department of equipment of the United States Railroad Administration, has been appointed assistant to the president of the **Locomotive Firebox Company,** with headquarters at Chicago.

E. Keough, assistant engineer maintenance of way on the Eastern lines of the **Canadian Pacific,** has resigned to become representative of the **American Fork & Hoe Co.,** in the Railway Appliance division, with headquarters at Chicago.

J. T. Harrington, a director and general counsel of the **Trumbull Steel Company,** has been elected president, to succeed Philip Wick, who has served as temporary president for three months during the company's financial reorganization.

The Pullman Company is offering its employees an opportunity to purchase 10,000 shares of its stock at $140 a share, to be paid for at the rate of $3 a month. Any employee of three months or more service with the company will be entitled to subscribe for one or more shares of stock based on his

annual salary. The employee will pay 4 per cent interest on the unpaid balance due on his stock which carries a dividend of 8 per cent. **The Pullman Car & Manufacturing Corporation** is also offering its employees the opportunity to purchase stock on similar terms.

C. H. Lang, assistant manager of the publicity department of the **General Electric Company,** has been appointed controller of budget for the company, a new position. Mr. Lang will report direct to the vice-presidents in charge of the several departments and to the controller.

Arthur W. Armstrong, secretary and treasurer of the **Ayer & Lord Tie Company,** Chicago, has been elected president and general manager, to succeed Russell Lord, deceased. Graeme G. Botts has been appointed treasurer, and Samuel E. Pryce has been appointed assistant treasurer.

Charles R. Cullen, formerly manager for six years on the west coast of South America for the Baldwin Locomotive Works, has joined the **American Foreign Sales Corporation,** 150 Broadway, New York City. Announcement of the formation of this organization appeared in the *Railway Age* for October 17. Mr. Cullen will represent the company's interests in Peru, Bolivia, Chile, and the Argentine with offices in Lima, La Paz, Santiago and Buenos Aires.

Joseph C. McCune, engineer of the Eastern district of the **Westinghouse Air Brake Company,** has been appointed assistant director of engineering, with headquarters at Wilmerding, Pa. Mr. McCune was born in January, 1890, at Brilliant, Ohio. In 1906 he entered Washington and Jefferson College. He received the first Sibley prize for scholarship at Cornell and graduated from the university in 1911 with the degree of mechanical engineer. From July, 1911, to February, 1912, he was employed by the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., and from the latter date until March, 1913, served with the Pittsburgh Railways Company. He then became assistant to the chief engineer of the Westinghouse Air Brake Company, and in May, 1915, mechanical expert, New York office, serving also on the Mexican border with the 7th Regiment, New York National Guard. From May, 1917, until August, 1919, he was First Lieutenant, Engineers, of the United States Army, ten months of his service being in France. In September, 1919, he returned to the Westinghouse Air Brake Company as a special engineer at Wilmerding; in January, 1920, was promoted to assistant to district engineer; in October, 1920, became assistant district engineer, and in January, 1922, was appointed district engineer, with headquarters at New York.

J. C. McCune

Frank Purnell has been appointed assistant president of the **Youngstown Sheet & Tube Company,** Youngstown, Ohio, and will be in charge of the company's affairs in the absence of the president. During the war he was connected with the steel section of the War Industries Board in Washington and after the war became vice-president of the Consolidated Steel Corporation, New York. Later he was made vice-president of the Bethlehem Steel Corporation in charge of its export trade and in 1923 re-entered the emplov of the Youngstown Sheet & Tube Company.

Frank W. Lampton has been appointed sales representative of the **Hunt-Spiller Manufacturing Corporation,** Boston, Mass., and will be located in the southwest territory. Mr. Lampton was born at Fort Scott, Kan., in 1890 and was educated in the public schools of that town, also in the Windsor Business College. He entered the employ of the St. Louis-San Francisco about 1907 as a machinist apprentice. After serving as a machinist on that road for about ten years, he became master mechanic of the Arcadia Coal & Mining Company. In August, 1920, he was appointed general foreman of the St. Louis-San Francisco, at Wichita, Kan., later being transferred to Thayer, Mo. In November, 1922, he was appointed general foreman of the South Springfield Terminal, from which position he resigned to become a representative of the Hunt-Spiller Manufacturing Corporation.

American Car & Foundry Company Enters Automotive Field

The American Car & Foundry Company has formed the American Car & Foundry Motors Company, which was incorporated in Delaware, on December 23. The new company will own a controlling interest in the Fageol Motors Company of Ohio, manufacturers of motor buses and trucks, and in the Hall-Scott Motor Car Company of Oakland, Cal., manufacturers of gasoline engines for motor trucks, airplanes and motor boats and the new company in turn will be controlled by the American Car & Foundry Company. This is the first important entry by a railroad equipment company into the automotive field and the formation of this company is in line with the trend toward new forms of locomotion in the railroad field. The new company was organized to develop the business in gasoline railway equipment and will manufacture trucks for railroad companies.

The personnel of the new company is as follows: Board of directors: J. M. Buick, S. M. Curwen, Charles Day, W. C. Dickerman, F. R. Fageol, W. M. Hager, E. J. Hall, C. J. Hardy, C. S. Sale, G. R. Scanland, B. C. Scott, N. A. Stancliffe, F. A. Stevenson, H. W. Wolff and W. H. Woodin; executive committee: W. H. Woodin, chairman, W. M. Hager, vice-chairman, S. M. Curwen, C. S. Sale and E. J. Hall. The officers are: W. H. Woodin, chairman of the board, C. S. Sale, president, E. J. Hall, G. R. Scanland, H. Hager and F. R. Fageol, vice-president, S. A. Mallette, treasurer, H. C. Wick, secretary and W. J. Harris, general purchasing agent.

No changes have as yet been made in the personnel of the Fageol Company or of the Hall-Scott Motor Car Company. The company will continue to operate plants owned by its subsidiaries, namely, the Fageol Company of Ohio and the Hall-Scott Motor Car Company located at Berkeley, Cal., and Kent, Ohio, and is considering other locations for additional capacity.

Obituary

B. H. Ryder, sales engineer of the American Steel & Wire Company, with headquarters at Chicago, died on December 26 from heart failure.

Edwin Grey Rust, district engineer of the Youngstown Sheet & Tube Company, Youngstown, O., died on December 25 from pneumonia.

Thomas Hall Gatlin, of Gatlin & Wolf, consulting engineers, Washington, D. C., and formerly chief engineer of construction of the Southern, died at a hospital in Washington on December 25.

Arthur Winslow Jones, manager of the Far East department of the International General Electric Company, Schenectady, N. Y., since its formation in 1919, and a member of the advisory committee of the company, died at his home in Schenectady, N. Y., on December 26.

Richard E. Bebb, steel manufacturer of Canton, Ohio, died on January 5 of heart disease at University hospital, Philadelphia. Mr. Bebb was the founder, principal stockholder and chairman of the board of directors of the Central Steel Company, Massillon, Ohio. He was born in Chillicothe on June 24, 1870, and was educated in the public schools and business college at Columbus, Ohio. He entered the employ of his father, a contractor, and subsequently went with the Columbus Bolt Works, of which he later held various positions until he became assistant manager. In 1899, with others, he formed the Columbus Vehicle Company, serving as its president and general manager, and in 1904, left that company to become sales agent for the Braeburn Steel Company. In 1906, he was made general manager of the Canton Stamping & Enameling Company, and subsequently served as its general manager and president.

Railway Construction

BOSTON & MAINE.—A modern coal distributing plant which will transfer coal from ships to railroad cars or to storage at a rate of 6,000 tons each eight-hour working day is to be built by this company at its Mystic Wharf coal handling properties. The contract with John H. Proctor & Company, of Boston, who are now assembling the material for construction, calls for expenditures aggregating $450,000.

CENTRAL OF GEORGIA.—This company is asking for bids for the construction of a nine-stall roundhouse, a storehouse, a boiler room and a lavatory at Albany, Ga.

CHICAGO & NORTH WESTERN.—A contract has been awarded to Peppard & Fulton, Minneapolis, Minn., for the construction of a top deck on Dock No. 1 at Ashland, Wis., to cost $375,000, as reported in the *Railway Age* of January 2.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has applied to the Interstate Commerce Commission for authority for the construction of a line of 9.3 miles easterly from Clark's Grove, Minn.

CHICAGO, ROCK ISLAND & PACIFIC.—This company is asking for bids for the construction of a one-story brick combination passenger and freight station, 24 ft. by 240 ft., with a kitchen annex 28 ft. by 35 ft., at Tucumcari, New Mexico.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—It is reported that plans are being prepared for the construction of a second track from Bellefontaine, Ohio, to Kenton, a distance of 24 miles, at a cost of $1,000,000.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—This company has awarded a contract to the McClintic-Marshall Company, Pittsburgh, for the erection of six small bridges of 650 tons' capacity, at various locations.

DENVER & RIO GRANDE WESTERN.—A new passenger station will be constructed at Ogden, Utah, at a cost of approximately $60,000.

GREAT NORTHERN.—The roundhouse at Hillyard, Wash., is being remodeled at a cost of $50,000.

MISSOURI PACIFIC.—This company is asking for bids for the construction of a one-story brick freight station, 40 ft. by 240 ft., at McGehee, Ark.

MISSOURI PACIFIC.—This company will soon ask for bids for the construction of 23 miles of additional double track, between St. Louis, Mo., and Jefferson City.

NORTHERN PACIFIC.—According to press reports, location surveys are being made for a line from Ellensburg, Wash., eastward to Priest Rapids. Location surveys were made several months ago for a line from Connell, Wash., westward to Priest Rapids. These surveys are being made, it is said, in contemplation of the construction of a cut-off from Connell to Ellensburg, which would effect a considerable reduction in the main line mileage to the coast by eliminating the swing southward from Connell through Pasco and Yakima. Surveys were made several years ago for a cut-off from Ritzville, 45 miles northeast of Connell, to Ellensburg, but the construction was not undertaken.

PENNSYLVANIA.—A contract has been awarded to the American Bridge Company, New York, for the fabrication and erection of a steel superstructure for extension of the tank shop at Olean, N. Y., to cost $225,000. A contract has also been awarded to the John Fleasey Company, Pittsburgh, Pa., for grading and masonry in connection with the elimination of grade crossings at Dixmont and Glenfield. Pa., to cost $560,000.

SOUTHERN PACIFIC.—A contract has been awarded to Lewis & Green, Stockton, Cal., for the construction of a subway under the tracks of the Southern Pacific and the Western Pacific at Miner avenue, Stockton, to cost approximately $100,000.

Railway Financial News

BOSTON TERMINAL COMPANY.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes as of 1915 to be $20,770,500.

CHARLOTTE HARBOR & NORTHERN.—*Control.*—See Seaboard Air Line.

CHICAGO & NORTH WESTERN.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon a narrow-gage branch line extending from Fennimore, Grant County, Wis., in a general northwesterly direction to Woodman, 16.4 miles.

CHICAGO & NORTH WESTERN.—*Bonds.*—The Interstate Commerce Commission has authorized this company to procure the authentication and delivery of $2,375,000 general-mortgage 5 per cent gold bonds of 1897, to be held by the company until further order of the commission.

CHICAGO, MILWAUKEE & ST. PAUL.—*I. C. C. Investigation.*—Hearings in connection with the Interstate Commerce Commission's investigation of the affairs of the Chicago, Milwaukee & St. Paul were resumed at New York on January 7 before Commissioner Cox and Examiner Bardwell.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—*Stock Increase.*—The stockholders have authorized an increase of the common capital stock from $3,000,000 to $9,000,000 for the payment of a 200 per cent stock dividend.

MARINETTE, TOMAHAWK & WESTERN.—*Final Value.*—The Interstate Commerce Commission has found the final value for rate-making purposes as of 1917 to be $283,720.

MINNEAPOLIS & ST. LOUIS.—*Receivers' Certificates.*—The receiver has applied to the Interstate Commerce Commission for authority for an issue of $200,000 of receivers' certificates, for the purpose of renewing a like amount of outstanding certificates.

NATIONAL RAILWAYS OF MEXICO.—*New Director.*—Thomas W. Lamont, of J. P. Morgan & Co., has been elected a director, to succeed Henry Ruhlender.

The following residents of the United States have been re-elected to the board: Jerome J. Hanauer, of Kuhn, Loeb & Co.; L. F. Loree, president of the Delaware & Hudson; R. G. Hutchins, Jr., Arturo M. Elias, De Witt Millhauser, Walter T. Rosen, Sir William Wiseman and Angel Lopez Negrete.

Mexicans on the board will include Alberto J. Pani, minister of finance; Benjamin Mendez, Mariano Cabrera, Victoria E. Gongora, Fernando Gonzales Roa, Leon Salinas, Manuel Gomez Morin, Eduardo Oritz, Agustin Logoretta and Elias S. A. de Lima.

NEW YORK, CHICAGO & ST. LOUIS.—*Bonds Sold.*—An issue of $9,575,000 refunding mortgage 5½ per cent gold bonds, series B, of the New York, Chicago & St. Louis, has been sold by a syndicate headed by the Guaranty Company of New York, Lee, Higginson & Co., Harris, Forbes & Co. and Dillon, Read & Co. The bonds mature on July 1, 1975, and are priced at 99 and interest, to yield 5.55 per cent. The Interstate Commerce Commission has authorized the sale of these bonds, issued in connection with the refunding of $9,575,000 of Toledo, St. Louis & Western prior lien bonds, which matured and were paid July 1, 1925.

Merger Hearings.—See article on another page, entitled "Nickel Plate Arguments Heard by I. C. C."

NEW YORK CONNECTING.—*Bond Issue.*—J. P. Morgan & Co. and Kuhn, Loeb & Co. are offering $3,500,000 5 per cent first mortgage gold bonds, series "B," due August 1, 1953, at 99½, subject to prior sale. The sale of these bonds is subject to the approval of the Interstate Commerce Commission.

PENNSYLVANIA RAILROAD EMPLOYEES purchased through their organization 1,093 additional shares of Pennsylvania stock in December, bringing their total holdings on January 1, 1926, to 88,885. There were 51 subscribers in December, making the total 19,062. Stock holdings on January 1 compare with 68,438 on the same date last year and with 30,341 on the same date in 1924. Total sub-

scribers on January 1 compare with 15,971 on January 1, 1925, an increase of 3,091.

POTEAU VALLEY.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for a certificate authorizing the abandonment of its line from Shady Point to Calhoun, Okla., 6.6 miles.

READER RAILROAD.—*Stock.*—This company has been granted authority by the Interstate Commerce Commission to issue not exceeding $325,600 of common capital stock, consisting of 3,256 shares of the par value of $100 each.

ROANOKE.—*Abandonment.*—The Interstate Commerce Commission has authorized this company to abandon its railroad which extends from Horners, Brunswick County, Va., in a general southerly direction through Northampton County, N. C., to Thelma, Halifax County, 6.5 miles.

SAN ANTONIO, UVALDE & GULF.—*Receivership Ended.*—Judge C. A. Boynton of the United States District Court at Waco, Tex., has issued an order terminating the receivership of the San Antonio, Uvalde & Gulf and turning the property back to the stockholders, effective January 1. The order states the stock and all outstanding indebtedness of the San Antonio, Uvalde & Gulf were recently acquired by the New Orleans, Texas & Mexico Railroad, and that both roads are included in a recent merger of nine railroads with the Missouri Pacific. Under this order A. R. Ponder retires as receiver.

SAVANNAH & ATLANTIC.—*Receivers' Certificates.*—The receivers of this company have applied to the Interstate Commerce Commission for authority to issue $150,000 of 8 per cent receivers' certificates. The certificates will be delivered to the Citizens & Southern Bank of Savannah at par in discharge of a like amount of certificates which matured December 29, 1925.

SEABOARD AIR LINE.—*Control of Charlotte Harbor & Northern.*—In connection with the purchase of the stock of the Charlotte Harbor & Northern, the Interstate Commerce Commission has authorized the Seaboard Air Line to issue not exceeding $880,000 of 6 per cent promissory notes.

SEABOARD AIR LINE.—*Extension of Bonds.*—This company, as successor to Raleigh & Augusta Air Line Railroad Company, has offered to extend the issue of $1,000,000 Seaboard Air Line-Raleigh & Augusta Air Line first mortgage 6 per cent bonds, maturing January 1, 1926, so that they shall mature January 1, 1931, with interest at the rate of 5 per cent per annum, the present mortgage security of the bonds to remain unimpaired. Bondholders are to deposit their bonds on or before January 15, 1926, with the Continental Company, Baltimore, Md.

SHEARWOOD RAILWAY.—*Extension of Loan Denied.*—The Interstate Commerce Commission has denied the application for the extension of a loan of $29,000 made on February 17, 1921, under Section 210 of the Transportation Act.

SOUTHERN.—*Bonds.*—The Interstate Commerce Commission has authorized this company to procure the authentication and delivery of $1,570,000 development and general mortgage 4 per cent gold bonds, series A, to be held by the company until the further order of the commission.

SOUTHERN PACIFIC.—*Acquisition.*—This company and the Texas & New Orleans have filed a joint application with the Interstate Commerce Commission for authority to acquire control of the Dayton-Goose Creek, a 25-mile line from Baytown to Dayton, Tex., by purchase of the $25,000 of stock by the Southern Pacific from R. S. Sterling for $900,000 cash and lease of the road to the Texas & New Orleans.

WILKESBARRE & EASTERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon 5500 feet of line at Kingston Borough, Pa.

Trend of Railway Stock and Bond Prices

	Jan. 5	Dec. 29	Last Year
Average price of 20 representative railway stocks	98.17	99.06	81.77
Average price of 20 representative railway bonds	94.32	94.49	89.53

Railway Officers

Executive

C. W. Michel, vice-president of the St. Louis-San Francisco, with headquarters at New York, has had his jurisdiction extended over the Muscle Shoals, Birmingham & Pensacola. **J. E. Hutchison,** vice-president and general manager, with headquarters at St. Louis, Mo., has had his jurisdiction extended over the Muscle Shoals, Birmingham & Pensacola. **F. G. Jonah,** assistant to the president and chief engineer of the St. Louis-San Francisco, has had his jurisdiction extended over the Muscle Shoals, Birmingham & Pensacola.

Financial, Legal and Accounting

C. B. Gordon, treasurer of the Kettle Valley, with headquarters at Penticton, B. C., has been promoted to comptroller, with the same headquarters.

James J. McLaughlin has been appointed general solicitor of the Clinchfield, with headquarters at Johnson City, Tenn., succeeding **Judge Hugh G. Morison,** deceased.

Charles L. Howard, secretary and assistant to the general counsel of the Western Railway Association, Chicago, has been appointed assistant general counsel and secretary.

A. A. McLaughlin, general solicitor of the United States Railroad Administration, has been appointed assistant to the director general of railroads, with office at Washington, D. C.

J. M. Shively has been appointed land commissioner of the Union Pacific, with headquarters at Omaha, Neb., succeeding **J. A. Griffith,** who has been retired under the pension rules of the company.

J. E. Baxter, assistant general auditor of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, has been promoted to general auditor, with the same headquarters, succeeding **W. E. Bailey,** deceased.

G. V. Shoup, general attorney of the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to general solicitor, in charge of legal matters on the lines west of El Paso, Tex., Tucumcari, New Mex., and Ogden, Utah, with the same headquarters, a newly created position.

R. M. Rainey, George M. Green and **Steeter Flynn** have been appointed general solicitors for Oklahoma of the Atchison, Topeka & Santa Fe, wth headquarters at Oklahoma City, Okla., succeding **J. R. Cottingham,** who died recently, and **E. E. McInnis,** who has been promoted to general solictor, with headquarters at Chicago.

E. H. Brown, assistant to the secretary of the Pennsylvania, with headquarters at Philadelphia, Pa., has been promoted to assistant secretary, with the same headquarters. **J. G. Watson,** chief clerk to the secretary at Philadelphia, has been promoted to assistant to the secretary succeeding Mr. Brown. **W. M. Fletcher,** assistant solicitor, with headquarters at Philadelphia, has been promoted to assistant general solicitor, with the same headquarters.

Nelson Trottman of the law firm of Trottman & Trottman, Milwaukee, Wis., has been appointed general attorney of the Chicago & North Western, with headquarters at Chicago, to succeed **Nye F. Morehouse,** who has been appointed assistant general solicitor. **J. C. Davis,** formerly director general of railroads and at one time general solicitor of the Chicago & North Western, **George E. Hise** and **E. Hyde** have been appointed attorneys for Iowa.

G. F. Glacy has been appointed deputy controller of the Boston & Maine, with headquarters at Boston, Mass. He will have supervision over all routine accounting and act for the controller in the latter's absence. **M. C. Bradley,** assistant

controller, will have charge of such special matters as may be assigned to him. The title of auditor has been changed to chief accountant and **W. C. Cruwys,** formerly auditor, has been appointed chief accountant, with duties same as heretofore. **W. F. Cummings** has been appointed auditor of disbursements in place of G. F. Glacy, promoted. Mr. Cummings will continue to act as valuation engineer pending closing the Boston & Maine valuation hearings before the Interstate Commerce Commission.

Operating

D. O. Townsend has been appointed traveling chief dispatcher of the Great Northern, with headquarters at St. Paul, Minn.

C. A. Moore, superintendent of the Union Pacific, with headquarters at Omaha, Neb., has been transferred to Kansas City, Mo., to succeed G. O. Brophy.

William Maxwell, superintendent of the Spartanburg division of the Southern Railway, Lines East, has been appointed assistant to the general superintendent, with headquarters at Spartanburg, S. C.

G. R. Mabie has been appointed trainmaster of the Paragould district of the Memphis division of the Missouri Pacific, with headquarters at Wynne, Ark., succeeding **L. A. Wallace,** who has been transferred to the Lake Charles district of the Louisiana division, with headquarters at Alexandria, La.

J. L. Niesse has been appointed joint superintendent of telegraph of the Cleveland, Cincinnati, Chicago & St. Louis, the Cincinnati Northern, the Peoria & Eastern and the Evansville, Indianapolis & Terre Haute and the Western Union, with headquarters at Indianapolis, Ind., succeeding **C. S. Rhoads,** who has retired. Mr. Niesse was born on January 24, 1895, in Madison, Ind., and was educated in the Madison (Ind.) High School, and Purdue University, and graduated from there with the degree of Bachelor of Science in Electrical Engineering. He received the degree of Electrical Engineer from that University in 1920. From June, 1916, to May, 1917, he was employed with the Western Union Telegraph Company in New York as an enginering assistant in the Central office department, and with the Western Electric Company at Hawthorne, Ill., as an engineer in the installation department. He entered the U. S. Army Service in May. 1917, and was consecutively second lieutenant, first lieutenant and captain, all with the engineers' corps, and still holds the latter position in the reserve corps. On December 4, 1918, he was appointed telegraph and telephone engineer on the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Indianapolis, Ind., and on August 1, 1922, was promoted to telegraph and telephone engineer of the New York Central Lines, which position he was holding at the time of his promotion to joint superintendent of telegraph.

J. L. Niesse

M. O. Dunbar, who has been appointed superintendent of the Spartanburg division of the Southern Railway, Lines East, with headquarters at Spartanburg, S. C., to succeed William Maxwell, was born at Stone Mountain, De Kalb County, Ga. He entered railway service with the Southern as telegraph operator in March, 1891, and was promoted to train dispatcher in 1901, chief dispatcher in 1911, and trainmaster in 1914, which position he held at the time of his appointment announced above.

W. F. Barnard, supervisor of fire prevention and insurance of the Wabash, with headquarters at St. Louis, Mo., has been promoted to superintendent of freight claim prevention, with the same headquarters, a newly created position. **H. G. Spaulding** has been appointed supervisor of fire prevention and insurance in place of Mr. Barnard.

H. W. Johnson, car accountant of the St. Louis-San Francisco, and **J. H. Doggrell,** superintendent of transportation, both with headquarters at Springfield, Mo., have had their jurisdictions extended over the Muscle Shoals, Birmingham & Pensacola (a subsidiary of the St. Louis-San Francisco). **W. R. Brown,** assistant superintendent of the St. Louis-San Francisco, with headquarters at Oklahoma City, Okla., has been appointed assistant to the president and general manager of the Muscle Shoals, Birmingham & Pensacola, with headquarters at Pensacola, Fla. **R. C. Greenaway,** general manager of the Muscle Shoals, Birmingham & Pensacola, has been appointed assistant general manager.

W. H. Bevans, superintendent of the Western division of the St. Louis-San Francisco, with headquarters at Enid, Okla., has been transferred to the Northern division, with headquarters at Fort Scott, Kan., succeeding **H. H. Brown,** who has retired. **S. J. Frazier,** assistant superintendent of the Central division, with headquarters at Fort Smith, Ark., has been promoted to superintendent of the Western division in place of Mr. Bevans. **C. T. Mason,** assistant superintendent of the Eastern division, with headquarters at Newburg, Mo., has been promoted to superintendent of the Southwestern division, with headquarters at Sapulpa, Okla., succeeding **S. T. Cantrell,** who has been assigned to other duties.

W. C. Showalter, superintendent of the Idaho division of the Northern Pacific, with headquarters at Spokane, Wash., has been transferred to the Tacoma division, with headquarters at Tacoma, Wash., succeeding **W. C. Albee,** who has retired. **James Shannon,** superintendent of the Pasco division, with headquarters at Pasco, Wash., has been transferred to the Idaho division in place of Mr. Showalter. **L. F. Newton,** assistant to the general superintendent, with headquarters at Seattle, Wash., has been promoted to superintendent of the Pasco division, succeeding Mr. Shannon. **H. C. James,** general superintendent of icing facilities, with headquarters at St. Paul, Minn., has been promoted to assistant to the general superintendent at Seattle in place of Mr. Newton. The position of general superintendent of icing facilities will not be filled.

H. H. Garrigues, superintendent of the Cleveland and Pittsburgh division of the Pennsylvania, with headquarters at Cleveland, Ohio, has been promoted to general superintendent of the Eastern Pennsylvania division, with headquarters at Harrisburg, Pa., succeeding **A. M. Parker,** whose death on December 10, was reported in the *Railway Age* of December 19. **A. C. Watson,** superintendent of the Conemaugh division, with headquarters at Pittsburgh, Pa., has been transferred to the Cleveland and Pittsburgh division in place of Mr. Garrigues. **J. B. Phelan,** superintendent of the Schuylkill division, with headquarters at Reading, Pa., has been transferred to the Conemaugh division, succeeding Mr. Watson. **R. C. Miller,** division engineer of the New York division, with headquarters at Jersey City, N. J., has been promoted to superintendent of the Schuylkill division, succeeding Mr. Phelan. **N. B. Pitcairn,** superintendent of the Erie and Ashtabula division, with headquarters at New Castle, Pa., has been transferred to the Middle division, with headquarters at Altoona, Pa., succeeding **William Elmer,** appointed special engineer on the staff of the chief engineer. **J. Appleton,** superintendent of the Monongahela division, with headquarters at Uniontown, Pa., has been transferred to the Erie and Ashtabula division in place of Mr. Pitcairn. **T. B. Farrington,** assistant general superintendent of motive power, with headquarters at Chicago, has been promoted to superintendent of the Monongahela division, succeeding Mr. Appleton.

Traffic

Charles M. Wynns, assistant general traffic manager of the Fruit Dispatch Company at New Orleans, has been promoted to general traffic manager, with headquarters at 17 Battery Place, New York City.

James G. Morrison, who has been promoted to general freight agent of the Northern Pacific, with headquarters at St. Paul, Minn., was born on December 9, 1878, at Amboy, Ill., and entered railway service in January, 1891, as a messenger on the Minneapolis & St. Louis. In April, 1897, he was employed as a clerk in the general freight department of the Chicago Great Western, later being promoted to chief rate clerk and chief clerk in the same department. Mr. Morrison was promoted to assistant general freight agent in October, 1909, and subsequently was promoted to assistant to the vice-president. During federal control he served as assistant secretary of the Western Freight Traffic Committee of the United States Railroad Administration. He was appointed assistant general freight agent of the Northern Pacific, with headquarters at St. Paul, upon the termination of federal control on March 1, 1920, and held that position until his recent promotion to general freight agent.

J. G. Morrison

Mechanical

H. L. Worman, superintendent of motive power of the St. Louis-San Francisco, with headquarters at Springfield, Mo., has had his jurisdiction extended over the Muscle Shoals, Birmingham & Pensacola (a subsidiary of the St. Louis-San Francisco).

H. W. Reinhardt, master mechanic of the Missouri division of the Missouri Pacific, with headquarters at Poplar Bluff, Mo., has been transferred to the Louisiana division, with headquarters at Monroe, La., succeeding **W. A. Curley,** who replaces Mr. Reinhardt on the Missouri division. **E. Colburn** has been appointed master mechanic of the Central division, with headquarters at Van Buren, Ark., succeeding **H. F. Jones,** who has been assigned to other duties.

Engineering, Maintenance of Way and Signaling

Michael J. Nugent has been appointed assistant maintenance engineer of the Delaware & Hudson.

H. B. Hoyt has been appointed superintendent of the timber preserving plant of the Buffalo, Rochester & Pittsburgh, with headquarters at Bradford, Pa., succeeding **F. M. Pugsley,** who has resigned.

A. S. Butterworth, chief engineer of the Muscle Shoals, Birmingham & Pensacola (a subsidiary of the St. Louis-San Francisco), has been appointed division engineer, with headquarters at Pensacola, Fla.

J. H. Cooper, supervisor on the Pennsylvania, with headquarters at New York, has been promoted to division engineer of the Monongahela division, with headquarters at Uniontown, Pa., succeeding **R. R. Metheany,** who has been transferred.

B. J. Schwendt, assistant signal engineer of the Ohio Central lines of the New York Central, with headquarters at Columbus, O., has been given extended jurisdiction to include the lines west of Buffalo, his headquarters being changed to Cleveland, O.

G. S. Lovering, assistant engineer of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been promoted to principal assistant engineer, with the same headquarters, succeeding **R. C. Smith,** who has resigned to enter the service of another company.

William Elmer, superintendent of the Middle division of the Pennsylvania, with headquarters at Altoona, Pa., has been appointed special engineer on the staff of the chief engineer, with headquarters at Philadelphia, Pa. **G. W. Snyder,** assistant to the stores manager, with headquarters at Philadelphia, Pa., has been promoted to assistant chief engineer in charge of maintenance, with the same headquarters, a newly created position.

Purchasing and Stores

F. J. McMahon, assistant general storekeeper of the New York Central, with headquarters at Collinwood, O., has been promoted to general storekeeper, with the same headquarters, succeeding **J. P. Murphy,** who has been promoted.

J. T. Goodloe has been appointed division storekeeper of the Southern, with headquarters at Spencer, N. C., succeeding **W. A. Miller,** deceased. **J. B. Lowd** has been appointed division storekeeper at Columbia, S. C., succeeding **G. W. Grier,** who has been transferred as division storekeeper, with headquarters at Macon, Ga., succeeding **U. S. Cornelius,** promoted to traveling storekeeper. **W. B. Nettles** has been appointed division storekeeper at Princeton, Ind., succeeding Mr. Lowd, transferred. **A. D. Roberts** has been appointed division storekeeper at Chattanooga, Tenn., succeeding Mr. Nettles, and **T. L. Hicks** has been appointed storekeeper at New Orleans, La., succeeding Mr. Roberts.

Special

Dr. R. C. Webb has been appointed chief surgeon of the Great Northern, with headquarters at St. Paul, Minn.

Luther Fuller, chief agricultural agent of the Erie, with headquarters at Jamestown, N. Y., has resigned to become chief agricultural agent of the Chicago & Eastern Illinois, with headquarters at Danville, Ill.

George O. Brophy, superintendent of the Kansas division of the Union Pacific, with headquarters at Kansas City, Mo., has been promoted to special representative of the department of public relations, with headquarters at Omaha, Neb., a newly created position.

Obituary

Charles Bennett Smith, formerly assistant general claim agent of the Chicago & North Western, died on January 2, at Wheaton, Ill.

Frank W. Smith, chairman of the Official Classification Committee, New York, died in a local hospital on December 23 following an operation. Mr. Smith entered railroad service in 1889 as general baggage agent for the New York, Ontario & Western. In 1893 he was promoted to chief clerk in the traffic department and in 1902 to assistant general freight and passenger agent. From 1908 to 1915 he was a member of the Uniform Classification Committee and was then appointed a member of the Official Classification Committee, which committee he has headed since 1920.

Howard Elliott, editor of the Union Pacific Magazine, with headquarters at Omaha, Neb., died at Los Angeles, Cal., on January 1, after an illness of three months' duration. He was born in 1883 at Indianapolis, Ind., and attended the law school of the University of California. He entered railway service as a messenger of the Illinois Car Service Association, later being appointed secretary to the general manager and then inspector of transportation of the Los Angeles & Salt Lake. Mr. Elliott was appointed executive assistant of the American Sugar Refining Company in November, 1917. He was appointed editor of the Union Pacific Magazine at the time of its inception in November, 1921, continuing in that position until his death.